

Heavy Equipment Fact Sheets for Canadian War Museum Guides and Interpreters Second Edition (2007)

By
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Note:

This document is intended to provide CWM guides and interpreters with a basic reference to the heavy equipment on display in the Canadian War Museum. It is organized by equipment type, because the layout and content of the galleries may change over time. For the same reason, there may also be equipment in the guide that is not present in the galleries.

Unless otherwise noted, all photos courtesy of Doug Knight.

Table of Contents

Table of Contents	2
General Notes	7
Section 1 – Artillery	8
Sources	8
General Notes	8
Smoothbore Artillery from 1650 to 1850	9
3-pounder Brass Cannon	9
18-pounder Cannon	10
32/64-Pounder Palliser Converted Rifled Muzzle Loading Cannon	10
18-pounder Carronade	10
American 90-mm Anti-aircraft Gun M1A2	11
American Dynamotor SD4 6ABB Type D 60-inch Searchlight	11
American 106-mm Recoilless Anti-tank Rifle M40A1	12
American 155-mm M109A4 Self-propelled Howitzer	13
Austrian 47-mm Böhler Model 35 Anti-tank Gun	14
British Hotchkiss 6-pounder Rifled Breech Loading Gun	14
British Armstrong 6-pounder 3-cwt Rifled Breech Loading Gun	15
British QF 6-pounder 7-cwt Mk V on Mk I Carriage Anti-tank Gun	16
British 9-pounder 8-cwt Mark II Rifled Muzzle Loading Gun	17
British QF 13-pounder Mk II Field Gun	18
British QF 13-pounder 9-cwt Antiaircraft Gun	19
British Sound Locator Mk 1	19
British QF 17-pounder Mark I Anti-tank Gun	20
British QF 25-pounder Mark II Field Gun	21
British Field Artillery Trailer No. 27 Mk 1/L 1941	21
British Armstrong 40-pounder 35-cwt Rifled Breech Loading Gun	22
Canadian Rocket Projector No. 8 Mk I “Land Service Mattress”	23
Canadian 20-mm Mk I Polsten Cannon on Quadruple Mounting C Mk I	24
Canadian 155-mm C1 Towed Howitzer	25
French 75-mm M1897 Field Gun	26
German 2-cm Flugabwehrkanone (Flak) 30 Anti-aircraft Gun	27
German 2.8-cm s PzB 41 Tapered Bore Anti-tank Gun	28
German 3.7-cm Panzerabwehrkanone (Pak) 36 Anti-tank Gun	29
German 7.5-cm Leicht Geschütz LG 1 (LG 40) Recoilless Rifle	29
German 7.5-cm Krupp Quick-firing (QF) Field Gun	30
German Horse-drawn Artillery Observation Wagon	30
German 7.5-cm Leichtes Infanteriegeschütz 18 Infantry Gun	31
German 8.8-cm Raketenwerfer 43 “Püppchen”	31
German 15-cm s FH m/02 Heavy Field Howitzer	32
German 21-cm Langer Mörser Heavy Howitzer	32
German 21-cm Nebelwerfer 42 Rocket Projector	33
German 60-cm Light Searchlight	33

German Minenwerfer (Trench Mortars)	34
German 24-cm “Albrecht” Trench Mortar	34
German 9.1-cm Lanz Smoothbore Minenwerfer	34
German 7.6-cm M1916 Light Minenwerfer on Flat-trajectory Carriage	35
Italian 105-mm L5A1 Pack Howitzer	36
Japanese 20-mm Type 98 (1938) Anti-aircraft/Anti-tank Cannon	37
Japanese 75-mm Type 41 (1908) Pack Howitzer	37
Soviet 14.5-mm Vladimirov ZPU-4 Anti-aircraft Gun	38
Soviet 122-mm Heavy Mortar M1943	38
Soviet 76.2-mm ZIS-3 Model 1942 Divisional Gun	39
Soviet 107-mm B-11 Recoilless Anti-tank Gun	39
Soviet 122-mm Gun A-19 Model 1931/1937	40
Soviet 122-mm Howitzer M1938 M30	40
Section 2 - Armoured Vehicles	41
Sources:	41
General Notes:	41
American M3 Lee Medium Tank	42
American M4A2 (76) W HVSS Sherman Medium Tank (M4A2E8)	43
Sherman Tank Hull Cutaway Trainer	43
American M24 Chaffee Light Tank	44
American M113A2 Armoured Personnel Carrier	45
Other American M113 Family Variants at the CWM	46
M113A2 Armoured Recovery Vehicle – Light (ARVL)	46
M113A2 Fitter’s Vehicle CFR 66-35697	46
M113A2 Combat Engineer Vehicle CFR 92-10688	46
M577A2 Command Post	47
M548 Cargo Carrier	47
American T17E1 Staghound Armoured Car	48
British FV4201 Chieftain Tank	49
British A22B Infantry Tank Mk IV Churchill III	50
British Mk IV “Great Eastern Ramp”	51
British Universal Carrier Mk I (Bren Gun Carrier)	52
Other Universal Carriers at the CWM	52
Tank Hunter	52
Universal Carrier Mk II	53
Universal Carrier No.2 Mk II with Ronson Flame-thrower	53
British Universal Carrier Mk II No. 2* with Wasp IIC Flame-thrower (in Gallery 3)	53
British Vickers Armstrong Valentine Mk VIIA Infantry Tank	54
Canadian Armoured Vehicle General Purpose (AVGP) Family	55
Canadian AVGP Cougar Fire Support Vehicle	56
Canadian AVGP Grizzly Armoured Personnel Carrier	56
Canadian AVGP Husky Repair and Recovery Vehicle	56
Canadian GM C15AA Armoured Ambulance	57
Canadian Ford Lynx Scout Car	57

Canadian Fox Armoured Car	58
Canadian Otter Light Armoured Car	58
Canadian “Tracked Jeep”	59
Tracked Jeep Mk I – The Bantam Armoured Tracked Vehicle	59
Prototype Tracked Jeep Mk II	59
Canadian Ram Mk II Tank	60
Canadian Grizzly Tank	61
Canadian 25-pounder Sexton Self-propelled Gun	62
German Goliath Demolition Vehicle	63
German Leopard C1 Tank	64
German Leopard C2 Tank	64
German Jagdpanzer IV /70 (SdKfz 162/1) Assault Gun	65
German PanzerKampfwagon (PzKpfw) II (Panzer II) Light Tank	66
German PanzerKampfwagon (PzKpfw) V Ausf. A, SdKfz 171 Panther Tank	67
Italian CV-33 II Tankette (L3/33)	68
Soviet T-34/85 Medium Tank	69
Soviet BRM-1K (BMP M1976/2) Armoured Reconnaissance Command Vehicle	70
Section 3 - Wheeled Vehicles	71
Sources	71
Motorcycles	71
British Triumph TRW Mk I Motorcycle	71
American Dodge WC-15 Command Car	72
American Dodge WC-18 Ambulance	72
American Dodge M37 CAN ¾-ton Truck	73
American Dodge M152 CDN ¾-ton Utility Vehicle	73
American Diamond T Model 969 Medium Breakdown Tractor	74
American Diamond T 4-ton 6-wheeled Type “M” Machinery Lorry	74
The American Jeep Saga	75
Jeeps at the CWM	76
Ford Model GP 1/4-ton 4x4 Truck	76
American Willys-Overland Model MB Jeep	76
Truck, Utility ¼ ton 4x4 M38 CDN	77
Truck, Utility ¼ ton 4x4 M38A1 CDN	77
Truck, Utility ¼ ton 4x4 M38A1 CDN3	77
Canadian Ford Model CIIADF Station Wagon Field Marshal Alexander’s Command Car	78
British Brockhouse ¾-ton Office Trailer General Crerar’s Office Trailer	79
Canadian GMC 1543 Modified Conventional Pattern Truck	79
Canadian Military Pattern (CMP) Vehicles	80
CMP Vehicles at the CWM	81
Chevrolet CMP C-8 8-cwt 4x2 Wireless Truck	81
General Motors CMP Field Artillery Tractor	81
General Motors CMP 8-cwt Truck, Heavy Utility, Personnel, Type C8A	82
Ford CMP 15-cwt 4x4 General Service Truck	82
Ford F15A CMP 15-cwt 4x4 Wireless (Signals) Truck	82

Ford F15A CMP 15-cwt "KL" Machinery Truck	83
General Motors CMP C60S 3-ton Light Breakdown Tractor	83
Canadian Ford 2-ton Half-track	84
Canadian Marmon-Herrington Model SDF 26F RCAF Crash Tender	84
German Kleine Kettenkraftrad Sd Kfz 2 Half-tracked Cargo Carrier	85
German Volkswagen Iltis Jeep	85
Section 4 - Amphibious and Over-snow Vehicles	86
American DUKW-353 Amphibious Truck	86
American M29C Weasel Amphibious Truck	87
Canadian Robin-Nodwell RN 25-35 Flex-track Over-snow Vehicle	87
Canadian Bombardier Military Half-tracked Snowmobile	88
Canadian Arsenals Mk III Penguin	88
Canadian Canadair CL-70 "RAT" Over-snow Vehicle	89
German Raupenschlepper-Ost RSO-01 Cargo Carrier	90
German Volkswagen Type 166 Schwimmwagen	90
Section 5 - Naval Equipment	91
Sources	91
Naval Mines	91
British (Swiss) 20-mm Mk 4 Oerlikon Gun on Mk V (RCN) Mounting	92
British QF 1-pounder Mk 1 "Pom Pom"	92
British Vickers-Maxim 1¼-pounder 37 Automatic Gun Mark III	93
British Naval 2-Pounder Mk VIII Gun on Single Mounting	93
British (Swedish) Naval 40-mm L/60 Bofors Gun in Mk VC Boffin Mounting	94
British (Swedish) Naval 40-mm Mk XI Bofors Guns in Twin RP 50 Mk V Mounting	95
British Naval 4-inch Mk XXI Gun on High Angle Mk XXIV Single Mounting	96
British Squid Mk IV Anti-submarine Mortar	96
German Molch (Salamander) Class Midget Submarine	97
German 88-mm/30 Ubtts L/30 Submarine Deck Gun	98
German 77-mm QF FK 96 n/A Field Gun on British Naval Mounting	98
Section 6 – Other Equipment	99
American McDonnell CF-101B "Voodoo"	99
German Weather Station "Kurt" set up in Labrador in 1943	100
Section 7 –Major Equipment in the Permanent Galleries	101
Gallery 1	101
American Model 1883 Gatling Gun	101
Gallery 2	102
British 12-pounder 6-cwt Rifled Breech Loading Gun	102
Gallery 3	103
American M4A4 Sherman Medium Tank (Sherman 5) "Forceful"	103
German Sturmgeschütz (StuG) III Ausf. G. SdKfz 142/2 Assault Gun	104
German 50-mm Panzerabwehrkanone (Pak) 38 Anti-tank Gun	105
German 88-mm Flugabwehrkanone (Flak 37) Anti-aircraft Gun	106

German 20-mm Flugabwehrkanone (Flak) 38 Anti-aircraft Gun	106
Gallery 4	107
American Huey Helicopter	107
American International Harvester M14 Armoured Half-track.....	108
British A41 Mk XI Centurion Tank.....	109
British Daimler Ferret Mk I Scout Car.....	110
British 4-inch Mk XVI Twin High-angle Naval Gun.....	111
Soviet T-72 Tank	112
Section 8 –Major Equipment not in the Galleries.....	113
American Dodge WC-54 Ambulance.....	113
American Dodge WC-56 Command Car	113
British Corgi Parascooter	114
French SS-11B Anti-tank Guided Missile.....	114

General Notes

The Audience. The readers are assumed to be CWM guides and interpreters with general background knowledge, but who may not be familiar with specific equipment in the Lebreton gallery. The notes are intended to enable the guide to field general questions from the public. Highly technical questions should be referred to the CWM Library.

Sources. The descriptions and technical data have been extracted from generally accepted references (which does not normally include the Internet). The source of the technical data is noted, but some figures have been generalized, either because of conflicting sources, or because precision would involve a long explanation. The text may be drawn from several references – major passages have been attributed at the end of the paragraph. Errors in data conversion from metric to Imperial units are the responsibility of the author.

“Designed in”. This means the country where the equipment was designed and initially manufactured. If it was also produced in Canada, this is noted.

“Used”. This indicates the years of general usage. The first date is reasonably accurate since it normally coincides with initial production. The last date is a general indication only, since the equipment may remain in use in the reserves or in other countries for many years after it is replaced in front line service. If the equipment was used by Canada, Canadian service dates are noted.

Section 1 – Artillery

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General Notes

Cwt means hundredweight, which was used as a common measure until the 1950s. It is equivalent to 112 pounds (50.9 kg). Markings on a gun barrel (eg 2 – 3 – 15) means that the weight of the barrel is 2 cwt, 3 quarters (one quarter = 28 pounds), and 15 pounds, for a total of 323 pounds (146.8 kg). Never complain about going to the metric system of measuring!

Smoothbore Artillery from 1650 to 1850

The display includes a selection of guns used from about 1650 to about 1850. During this time, there were few major changes in the general design and manufacture of artillery. The guns used on land or at sea were frequently identical, and would be mounted on a carriage suitable for their intended use. In general, naval and fortress guns would have a wooden carriage with small wheels, while cannon used in the field army would have large wheels for towing by a team of horses.

Guns fired solid shot (cannon balls), grape shot (a group of smaller cannon balls), canister (a tin case containing a large number of musket-sized balls – essentially a large shotgun shell), and some specialised ammunition such as chain or bar shot (two cannon balls connected by a chain or bar to tear down ship's masts and rigging), and sometimes “common shell” or explosive projectiles.

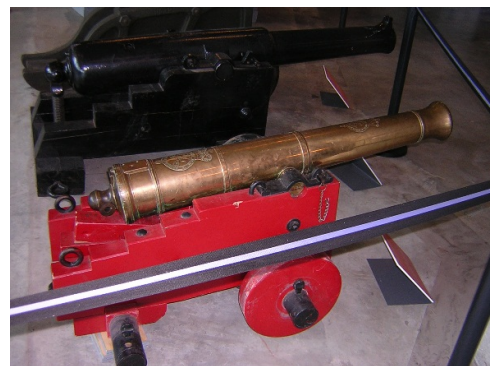
Artillery was generally divided into:

- **Cannon.** These had long, heavy, cast iron barrels firing a solid shot weighing up to 19 kg (42 lb) (some siege guns fired a heavier shot).
- **Carronades.** These were small guns that fired a large heavy shot with a reduced powder charge. Less powder reduced the stress on the gun, which could then be made lighter and had significantly less recoil. It had the major disadvantage of having a much shorter range than an equivalent cannon. Carronades were frequently mounted on small ships, giving the ship firepower beyond its expected capability.
- **Mortars.** These lobbed an explosive shell high into the air, for firing over the walls and into a fort. They used explosive shells with primitive fuses.

3-pounder Brass Cannon

I. H. King manufactured the brass cannon in 1807. It has a 75-mm (3 inch) smooth bore and weighs 143 kg (314 lb). Smaller naval guns were frequently made of brass to overcome the rust problem on an iron cannon at sea. Colonel H. A. Bate (commanding officer of the Governor General's Foot Guards 1906-1908) brought the artefact to Canada from the British West Indies in the early 1900s. He used them to decorate the entrance to his home in Ottawa and the carriage is for display purpose only.

CWM 19610055-002



18-pounder Cannon

These CWM artefacts are 18-pounders that were cast about 1650. They were emplaced on Carleton Island in Lake Ontario during the American Revolution.

CWM 19960097-001 and 19960097-002



32/64-Pounder Palliser Converted Rifled Muzzle Loading Cannon

When rifled artillery was introduced the British Army had large numbers of smooth bore guns. It was cheaper to convert these guns to rifling than replace them. In 1863, Sir William Palliser developed a successful method of conversion and eventually more than 2,000 guns were converted. The Palliser System consisted of boring out the cast iron smoothbore gun to form a casing, and then inserting a coiled wrought iron barrel, which was kept in position by an iron collar and a screw plug under the trunnions. Most conversions were carried out at the Royal Gun Factory Woolwich.

The artefact is a 58-cwt 64-pounder rifled muzzle loader and was converted from the 32-pounder 58-cwt smoothbore cannon about 1887. In 1895, there were 25 32/64-pounders in Canada, mostly at the defended ports (Halifax, Quebec, St. John, NB, etc.) The artefact was modified from the smoothbore to the rifled gun by Gilbert and Sons, Montreal – the first time that major modifications were made to artillery in Canada.

CWM 19850408-001

18-pounder Carronade

The CWM carronade is an 18-pounder mounted on an iron garrison carriage. The barrel is dated 1808, and weighs 512 kg (1,127 lb) and the carriage weighs 484 kg (1,064 lb) and contains the serial number 10. Early iron carriages were prone to shattering although they stood up to the weather better than wood. Fortress guns frequently had two carriages – an iron one for daily use and a wooden one that was stored inside and protected from the elements for use in wartime. The elevation scale on the breech is graduated from 0 – 14 (hundred yards?). In 1895, there were eleven 18-pounder carronades in Canada, six at Quebec City and five at Fort Henry in Kingston. The artefact was presented to Major-General J. H. MacQueen, CBE, who was the Honourary Colonel Commandant of the Royal Canadian Ordnance Corps 1951/52.

CWM 19760331-001



American 90-mm Anti-aircraft Gun M1A2

Used by Canada: 1952 - 1960

Technical Data (Hogg. *Anti-aircraft Artillery*)

Calibre: 90 mm (3.54 in)

Weight in action: 8,618 kg (18,960 lb)

Muzzle velocity: 823 m/sec (2,702 ft/sec)

Rate of fire: 15 rounds/min

Effective AA ceiling: 10,300 m (33,800 ft)

Projectile weight: 10.6 kg (23.3 lb)



History

America designed the 90-mm anti-aircraft gun in 1938 and approved it for production in 1940. By the time of the North African landings in 1942, more than 2,000 guns had been issued. It became the standard American mobile medium anti-aircraft gun during the war. It was used with the M33 fire control system that include a radar to locate and track the target, a predictor to estimate the future location of the aircraft, and an automatic fuse setter and rammer to speed up the loading process.

Canada bought 400 “slightly used” M1A2 guns in the early 1950s to replace the aging 3.7-inch guns, which had been produced in Canada during the Second World War. The 90-mm gun remained in service until 1960, and was the last medium/heavy anti-aircraft gun used in Canada. When the Canadian Army received the CWM artefact (#29012) in 1964, the gun was assigned to 128 Heavy Anti-aircraft Battery, RCA, in Picton, Ontario, and probably remained with that unit until the gun was removed from service.

CWM 19660030-001

American Dynamotor SD4 6ABB Type D 60-inch Searchlight

Also produced in Canada. Used by Canada: 1939 – 1960

History

Shortly before the Second World War, the Canadian Army ordered 80 American-designed 60-inch searchlights from Canadian General Electric in Peterborough, Ontario. Delivered in 1940-41, the lights were used as part of the harbour defences on both coasts and in Newfoundland. The lights were mounted on a trailer with a beam concentrator to give greater range. They put out 800,000,000 candlepower, and on a clear night, they could illuminate a ship at a distance of 8 kilometres (5 miles). The photo is from the CWM Web site. The CWM artefact was used as an experimental unit at Shirley’s Bay, near Ottawa.



CWM 19680056-001

American 106-mm Recoilless Anti-tank Rifle M40A1

Used by Canada: mid-1950s - 1988

Technical Data (Hogg, Ian V. *Tank Killing*)

Weight in action: 220 kg (485 lb)

Maximum range: 7,700 m (8,420 yd)

Effective range: about 800 m (875 yd)

Weight of projectile: 7.7 kg (17 lb)

Ammunition type: HEAT, anti-personnel

Armour penetration: 450 mm



History

The 106-mm Recoilless Rifle is a lightweight recoilless gun, which can function in either the anti-tank or anti-personnel role. The calibre of the rifle is actually 105-mm, but it was designated 106-mm to distinguish it from an unsuccessful predecessor. The M79 mount can be carried on a vehicle or deployed on the ground. The M-8C spotting rifle on top of the barrel fired projectiles that matched the ballistic trajectory of the 106-mm ammunition. The gunner fired the spotting rifle until he hit the target, and then fired the main gun.

In Canada, the 106-mm Recoilless Rifle came into service in the mid 1950's, mainly to cover the zone inside the minimum effective range of the SS-11 anti-tank guided missiles. It was retired from the Regular Force in 1976 with the introduction of the TOW missile system and was replaced in the reserves in 1988 by the Carl Gustaf gun. The CWM artefact is mounted on an M38A1 CDN3 jeep.

When a recoilless rifle is fired, it vents some of the propellant gases out of the breech (similar to a rocket). This eliminates the recoil, but creates a significant blast signature, which extends in a cone-shaped fan 68 m (75 yd) deep and 136 m (150 yd) wide. This gives away the gun's position and forces a "shoot and scoot" tactical doctrine. It also prevents the gun from being used under cover, such as in a bunker or building.

CWM

American 155-mm M109A4 Self-propelled Howitzer

Used by Canada 1968 – 2005

Technical Data

Detachment (Crew):	ten
Calibre:	155 mm (6.1 in)
Weight of gun:	27,4 tonnes
Rate of fire:	1 - 2 rounds/min (sustained)
Maximum range:	14,600 m (15,980 yd) – M109 18,000 m (19,700 yd) – M109A4
Projectile weight:	37 - 45 kg (85 - 100 lb) depending on type
Ammunition types:	High explosive, smoke, illumination, and others



History

A self-propelled (SP) gun or howitzer is not a tank. It is used in the same fashion as a towed field gun or howitzer, and supports the infantry with indirect fire – the target cannot be seen from the gun. However, unlike a towed gun that needs a truck to move it from one gun position to the next, an SP is permanently mounted on a mobile chassis – normally tracked, but there are exceptions. Light armour gives the gun detachment some protection from shell splinters and small arms. A limited amount of ammunition is carried on the chassis, and an ammunition vehicle normally accompanies the howitzer.

After a long development process, the M109 entered production in late 1962, and eventually 3,786 howitzers were manufactured for the US and other countries. It entered service in the US in 1963. A longer barrel was fitted starting in 1970, which increased the normal maximum range to 18,000 m (19,700). The range could be increased to about 30,000 m (32,800 yd) using rocket-assisted projectiles. In addition to its normal ammunition, the M109 could fire improved conventional munitions (flechettes, cluster bomblets, and mines) and a small nuclear warhead.

The Royal Canadian Artillery took delivery of 76 M109 howitzers in 1968, and used them in Germany and in Canada. It replaced the 105-mm C1 and 155-mm C1 towed howitzers, although the 105-mm howitzer remained in service. Over the years, the guns were upgraded to their final M109A4 version. RCA regiments normally used the M548 Cargo Carrier as an ammunition vehicle.

The First Regiment, Royal Canadian Horse Artillery was the first Canadian unit to fire the gun in Germany in 1968, and on 25 February 2005, at the end of a two-day exercise in Shilo, Manitoba, fired the last round by a Canadian M109 (an illumination shell), ending a thirty-seven year career. The photo is from the CWM web site.

CWM 20030358-019

Austrian 47-mm Böhler Model 35 Anti-tank Gun

Used 1934 – 1945

Technical Data (Chamberlain and Gander. *Anti-tank Weapons*)

Calibre: 47 mm (1.85 in)
Weight in action: 336 kg (740 lb)
Muzzle velocity: 670 m/sec (2,198 ft/sec)
Weight of projectile: 1.45 kg (3.2 lb)
Ammunition type: Armour-piercing



History

The Böhler Model 35 was first produced in 1935 and was widely used in Austria, Poland, Italy, Russia, Romania, and the Netherlands. Despite its export success, it was not a good gun, because it lacked both hitting power and a protective shield for the crew. Germany captured and used a number of guns early in the Second World War. Because of its light weight, it was issued to mountain troops.

There were many variants of the gun with different barrel lengths, and some were fitted with muzzle brakes. In action, the wheels could be removed to lower its silhouette. Most versions could be broken down into separate loads for pack transport.

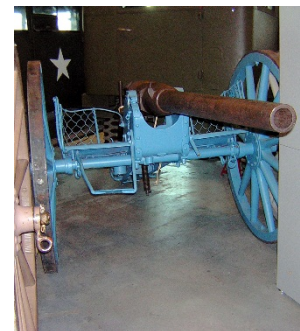
CWM 19450034-014

British Hotchkiss 6-pounder Rifled Breech Loading Gun

Used by Canada: 1900 (?) to 1945

Technical Data (Hotchkiss 6-pounder Handbook)

Calibre: 57 mm (2.244 in)
Weight of barrel: 355 kg (783 lb)
Range: 6,810 m (7,500 yd)
Projectile weight: 2.72 kg (6 lb)



History

Benjamin B. Hotchkiss (1826-85) was an American inventor, whose guns were manufactured in Britain, France and America. This artefact has not been completely identified, but the gun is definitely a Hotchkiss 6-pounder, but the carriage is not associated with the gun, and the gun could not be fired from this carriage. Canada used the 6-pounder from the early 1900s until the Second World War, when it was still in use as a “bring to” gun for the Examination Service at defended ports on both coasts. The carriage is a Boer War trophy that originally mounted a 9-pounder muzzle loading rifle.

CWM 19660045-003

British Armstrong 6-pounder 3-cwt Rifled Breech Loading Gun

Used by Canada: 1866 – 1870s

Technical Data (New Zealand - Guns at Waiouru)

Calibre: 62.5 mm (2.5 in)

Weight of barrel: 153 kg (337 lb)

Range at 12° elevation: 2,743 m (3,000 yd)

Projectile weight: 2.72 kg (6 lb)

Ammunition types: Solid shot, HE, case (a tin filled with lead musket balls)



History

The Crimean War debacle forced Britain to improve its artillery. In 1855, after some unsuccessful experiments, W. G. Armstrong, a lawyer turned engineer, demonstrated a wrought iron, breech-loading, rifled gun, known as a Rifled Breech Loader (RBL). Armstrong guns were built by shrinking layers (coils) of metal over an inner sleeve that contained the rifling and propellant chamber, allowing the outer layers to carry a share of the firing stress. The number of layers depended on the size of the barrel. Rifling is a series of spiral grooves in the interior of a gun barrel that give a spin to the projectile as it goes up the barrel. This stabilizes the shell in flight and improves range and accuracy. The concept had been understood since the 1500s, but the necessary technology did not exist until the mid-nineteenth century. Armstrong's gun was more accurate and powerful than the smoothbore muzzle-loading cannon of the time.

Large numbers of Armstrong guns were produced for the British Army and Royal Navy between 1859 and 1862. However, there were problems with the manufacture of the ammunition, and in obtaining acceptable obturation (sealing the breech of the gun), and the gun was not satisfactory in the field. No Armstrong guns were produced after 1864, and many of the existing guns were either converted into muzzle-loaders after 1870, or sent to the colonies.

The 6-pounder version was proposed to the British Army in 1858 as a mountain gun, but the Royal Artillery rejected it as too heavy. However, the Royal Navy used it as a boat gun (mounted in cutters, and other small vessels), and the Royal Marine Artillery used it to support landing parties. A "screw and nut" gear, operating through a bed mounted on the trail, controlled elevation. There was no traversing gear.

The Halifax Field Battery used the 6-pounder Armstrong gun starting in November 1866. It was the first breech-loading field gun issued to Canadian gunners. It was replaced in the 1870s by the 9-pounder rifled muzzle-loading gun, although six 6-pounder Armstrong guns were still at Kingston, Ontario, in 1895.

CWM 19440020-003

British QF 6-pounder 7-cwt Mk V on Mk I Carriage Anti-tank Gun

Also produced in Canada

Used by Canada: 1943 - 1957

Technical Data (Mark IV and Mark V gun) (Knight)

Detachment (crew): five

Calibre: 56.5 mm (2.244 in)

Weight: 1,142 kg (2,521 lb)

Maximum range: 5,025 m (5,500 yds)

Rate of fire: 6 - 10 rounds/min

Projectile weight: 3.18 kg (7 lb) (APCBC)

Ammunition: AP, APCBC, APDS, HE

Armour penetration: 88 mm using APCBC, 146 mm using discarding-sabot ammunition



History

The 6-pounder 7-cwt anti-tank gun was designed in 1938 and the design was sealed against the time when the 2-pounder anti-tank gun became obsolete. Unfortunately, the loss of equipment during the evacuation of the British Army at Dunkirk prevented the British production lines being switched over to the 6-pounder until 1941.

In Canada, Dominion Engineering Works produced more than 8,000 guns and as many spare barrels during the war – 10% of the total production in the British Commonwealth. The gun carriages were manufactured by Regina industries in Saskatchewan. The gun was mounted on a towed carriage and was also used as a tank gun in many British tanks and the Canadian Ram tank. The 6-pounder Mark II (towed) and Mark III (tank) had a shorter barrel and no muzzle brake. The Mark IV (towed) and Mark V (tank) were more powerful, and had a longer barrel with a muzzle brake. Tank barrels could be mounted on the towed carriage, but the towed barrels lacked the special flanges for tank mounting. A Universal Carrier or a 15-cwt truck normally towed the gun.

Every Canadian anti-tank artillery regiment, infantry, motor, and reconnaissance battalion used the gun during the war, and it remained in service until 1957. Using armour-piercing, discarding sabot ammunition, it had a better anti-tank performance than the 75-mm gun in the Sherman tank. Under the right conditions, it could and did destroy German Tiger tanks. The infantry especially appreciated its ability to destroy houses and pillboxes.

The 6-pounder was also mounted on Fairmile “D” motor torpedo boats (used by the Canadian 65th MTB Flotilla) and a variant was mounted in the Mosquito Mark XVIII aircraft for anti-submarine use. A 6-pounder-equipped Mosquito sank U-123 in November 1943.

The CWM artefact is a Mark V. It was manufactured in Canada, and spent most of its life as a test gun at the Proof and Experimental Establishment in Nicolet, Quebec.

CWM 19660045-001

British 9-pounder 8-cwt Mark II Rifled Muzzle Loading Gun

Used by Canada: 1872 – 1905

Technical Data (DND and DHH)

Detachment: seven - eight
 Calibre: 76.2 mm (3 in)
 Weight (gun only): 424 kg (934 lb)
 Range: 2,925 m (3,200 yd)
 Projectile weight: (shrapnel) 4.1 kg (9 lb)
 Ammunition types: HE, shrapnel, case



History

Designed in 1871, the 9-pounder rifled muzzle-loading (RML) gun was the standard artillery weapon in Canada during the last quarter of the nineteenth century. It was mounted on a variety of field and garrison (fortification) carriages, depending on the role of the unit. It was also mounted on gun sleighs for transport in the winter.

The 9-pounder RML was used during the 1885 Riel rebellion. In 1885, A and B Batteries under command of LCol C.E. Montizambert, with four guns and a combined strength of 219 officers and men of the permanent force artillery, joined Major General Sir Frederick Middleton's column. B Battery, commanded by Maj G.J. Short, went with LCol William Otter's column. A Battery, with its two 9-pounders was the first of the Regiment to see action at Fish Creek, where a skirmish with a heavily defended Metis position resulted in great praise being given to gunners. B Battery, having traded their own 9-pounders for two lighter but decrepit 7-pounders from the NWMP, met the enemy, Chief Poundmaker and his 200 man force at Cut Knife Creek. Once again the gunners fought with distinction. The North West Rebellion was quelled with A Battery participating in the final battle at Batoche. The campaign cost A and B Batteries a total of four killed and 19 wounded. Gunners' Corpre and Beaudry of A Battery were recommended for the Victoria Cross for rescuing a wounded comrade at the battle of Batoche. (DND)

The barrel was constructed from cast steel, with the breech area strengthened by shrinking a wrought iron sleeve over it. It used a three-groove rifling system, and the ammunition had studs to fit in the rifling. It could also fire case shot containing 110 musket balls with an effective range of 320 m (350 yd).

The CWM artefact (serial no 595) is a Mark II that was originally intended for sea service. The carriage is a reproduction of a slide mounting for a traversing carriage, which was used in fortifications. Another version was the 9-pounder 6-cwt gun that was intended for field use. The large hole on the top right of the breech is for the gun sight. Brigadier W. W. Turner donated the gun to the museum. It possibly served in a Royal Artillery Battery stationed in the Halifax garrison in the 1870s (1, 2, and 7 Battery, RA, were in Halifax from 1873-1876).

See also Chown, John. *The 9-Pdr Muzzle Loading Rifle*. Museum Restoration Service, 1967.

CWM 20010245-002

British QF 13-pounder Mk II Field Gun

Used by Canada 1905 – 1918

Technical Data (Hogg. *Allied Artillery of WW1.*)

Detachment (crew):

Calibre:	76 mm (3 in)
Weight in action:	1,016 kg (2,236 lb)
Maximum range:	5,390 m (5,900 yd)
Muzzle velocity:	510 m/sec (1,675 ft/sec)
Projectile weight:	5.7 kg (12.5 lb)
Ammunition type:	Shrapnel, high explosive



History

Before mechanisation, the horse artillery provided fire support to the cavalry, with the gunners riding on horseback, or on the gun limbers. This need for mobility was offset by the requirement to have a relatively light gun. When the British Royal Artillery was re-equipped after the Boer War with 18-pounder field guns and 4.5-inch howitzers, the Royal Horse Artillery received the 13-pounder gun.

The 13-pounder's specifications were written in 1901 and the gun was adopted in 1904. By 1914, 245 had been produced in Britain and another 21 in India. The pole type carriage allowed a short turning circle, but limited its elevation to 16 degrees, which in turn limited its maximum range. The gun was very mobile, but its shell was considered too light (the shell actually weighed 12.5 pounds, but the nomenclature was rounded up to 13 pounds) once trench warfare began. It was slightly unstable when fired and required frequent relaying. The 13-pounder performed well in the mobile battles in France in August 1914, and also in the Middle East where cavalry continued to be somewhat effective. It was modified for use on ships and also as an anti-aircraft gun. Today in Britain, the Kings Troop, Royal Horse Artillery, continue to use the 13-pounder for ceremonial demonstrations and displays.

The Royal Canadian Horse Artillery was formed in 1905 and was equipped with the 13-pounder in 1906. They took their guns to France in the First World War, but there was little work for the cavalry and their supporting artillery. The 13-pounder shell was too light to be effective in the trenches, and even worse, only shrapnel shells were provided. After the war, the Royal Canadian Artillery standardised on the 18-pounder gun for all field units, and the 13-pounder was removed from Canadian service.

The CWM artefact was manufactured in 1911 and has the serial number 279.

CWM 19890086-919

British QF 13-pounder 9-cwt Antiaircraft Gun

Used by Canada: 1918 – early 1940s

Technical Data (Hogg, *Anti-aircraft Artillery*.)

Calibre: 76 mm (3 in)

Weight in action: 7,636 kg (16,800 lb)

Muzzle velocity: 655 m/sec (2,150 ft/sec)

Rate of fire: 18 rounds/min

Maximum AA ceiling: 5,800 m (19,000 ft)

Projectile weight: 5.9 kg (13 lb)



History

During the First World War, the increasing use of aircraft created an urgent need for an effective anti-aircraft gun. At first, standard 13-pounder horse artillery guns were mounted on pedestals on a truck. The CWM artefact is an improved version, the 13-pounder 9-cwt, which was an 18-pounder field gun with a barrel sleeve reducing its diameter to fire the 13-pounder projectile. It still used the 18-pounder cartridge and the combination of large cartridge and small projectile gave significantly improved performance. The gun was mounted on a pedestal (Mounting, Motor Lorry, QF 13-pr, serial no A3414, manufactured in 1916), which was carried on the back of a truck. It was the standard British anti-aircraft gun in field use during the First World War. After the First World War, Canada had ten of these guns. At the beginning of the Second World War, eight remained (two in Esquimalt, four in Halifax and two in Quebec City) with only 307 rounds of ammunition. They represented more than half the anti-aircraft guns in the country.

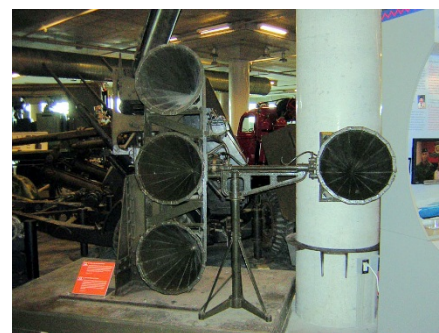
CWM 19390002-081

British Sound Locator Mk 1

Used 1914 - 1918

History

In the First World War, the detection of enemy aircraft was a significant problem. The only possible technical solution was using a sound detector. Tubes connected the bases of two horizontally mounted gramophone-style horns to a pair of stethoscope earpieces. An operator moved the detector until the sound was heard equally in each ear, at which point (theoretically) it would be pointed in the direction of the aircraft. A second operator used the vertically mounted horns to estimate the height. The system was rudimentary at best, because this established the location of the aircraft when that the sound was made (not when the sound was detected). The aircraft would have moved in the time that the sound took to reach the detector, and laborious calculations were required to properly aim an anti-aircraft gun. However, until the development of radar in the late 1930s, it was the only method of detecting an aircraft in cloudy or hazy weather.



CWM 19440018-001

British QF 17-pounder Mark I Anti-tank Gun

Used by Canada: 1942 – 1952

Technical Data (Canadian Army)

Detachment (crew): seven

Calibre: 76 mm (3 in)

Weight: 2,966 kg (6,526 lb)

Traverse: 30° left and right of centre

Rate of fire: 6 - 10 rounds/min

Maximum range (HE): 9,140 m (10,000 yds)

Projectile weight: 7.7 kg (17 lb)

Ammunition: AP, APDS, HE

Armour penetration: (AP), 109 mm (at 913 m (1,000 yds) against 30° sloped armour)
(APDS), 231 mm (at 913 m (1,000 yds) against 30° sloped armour)



History

The 17-pounder anti-tank gun was designed in 1941 and approved for service in 1942. Because of a shortage of carriages, it was initially mounted on a 25-pounder field gun carriage and rushed to the Middle East, where it was the only British anti-tank gun capable of defeating the German Tiger tank.

Considered too large to be an infantry anti-tank gun, it served in the artillery anti-tank regiments during the Second World War. In 1944, new ammunition – APDS, armour-piercing discarding-sabot – was issued, which was capable of penetrating the front armour on Tiger and Panther tanks. The APDS shot is a thin tungsten carbide shot in a light alloy sheath (sabot). Having a high propellant charge and a relatively light weight, the shot has a high muzzle velocity. As the round leaves the muzzle, the sabot strips away to reduce drag, and the shot retains its high velocity over a long range.

To increase its mobility, the 17-pounder was mounted on the Valentine tank chassis (“*Archer*”), which was considered a very successful self-propelled anti-tank gun, and also on the American M10 “tank destroyer”. The gun was also adapted to a version of the *Sherman* tank, which was then called the *Firefly*. One tank in every four-tank troop in the Canadian armoured regiments in Northwest Europe was equipped with the *Firefly*.

The anti-tank platoons of the Canadian infantry battalions that served in Korea arrived there with their 17-pounders, but because of the low tank threat and difficulty of handling a heavy gun in the Korean hills, they were soon replaced with the American 75-mm Recoilless Rifle. The 17-pounder continued in service with the Canadian Army until 1952, when the primary responsibility for anti-tank defence in the Canadian Army was turned over to the Royal Canadian Armoured Corps. The gun was eventually replaced with Anti-tank Guided Missiles and the 106-mm Recoilless Rifle.

CWM 19990220-011

British QF 25-pounder Mark II Field Gun

Used by Canada: 1939 – 1956 (Also produced in Canada)

Technical Data (Knight. *The 25-pounder in Cdn Service.*)

Detachment (Crew):	six
Calibre:	87.6 mm (3.45 in)
Weight in action:	1,804 kg (3,968 lb)
Maximum range:	12,244 m (13,400 yd)
Rate of fire:	5 rounds/min (sustainable)
Ammunition types:	High explosive, smoke, anti-tank, illumination, and others



History

Most Allied gunners considered the 25-pounder field gun, which was designed in the late 1930s, to have been the best field artillery weapon of the Second World War. More than 17,700 were manufactured, with 3,781 of those built in Canada by in Sorel, Quebec. It was the standard field gun used by the Royal Canadian Artillery during the war and continued in service in Canada until 1956, when NATO standardisation forced its replacement by the American 105-mm howitzer. In action, the gun was mounted on a circular platform, giving 360° traverse. A muzzle brake was added in 1942 to ease the load on the recoil system while firing anti-tank shot using super-charge. The gun used a system of three propellant charges (plus a supercharge) to vary the trajectory of the shells and hit targets in dead ground behind hills, etc. Other versions of the gun included a narrow version that could be towed by a jeep down jungle paths, an Australian pack version, and a Canadian-designed carriage that was modified to allow higher elevations for mountain use.

CWM 1988001-709 and 19990009-002 in Gallery 3

British Field Artillery Trailer No. 27 Mk 1/L 1941

Used by Canada: 1940-1956 (also produced in Canada)

British artillery guns were horse-drawn until the end of the First World War. Each gun had a two-wheeled limber that supported the trail of the gun, provided a pole for hitching the horses, and carried ammunition and gun tools. When the 25-pounder gun was developed in the 1930's, even though it was towed by a motor vehicle, British doctrine still required a limber. The Field Artillery Trailer filled this role, although it needed a skilled driver to handle the combination of Field Artillery Tractor, trailer, and gun, particularly when backing up. The trailer carries thirty-two 25-pounder shells and charges. Other equipment, such as camouflage nets, could be carried on top. Canada manufactured more than 6,000 trailers during the Second World War.



CWM 19940051-001

British Armstrong 40-pounder 35-cwt Rifled Breech Loading Gun

Used by Canada: 1882 – 1900 (?)

Technical Data

Calibre: 120.6 mm (4.75 in)

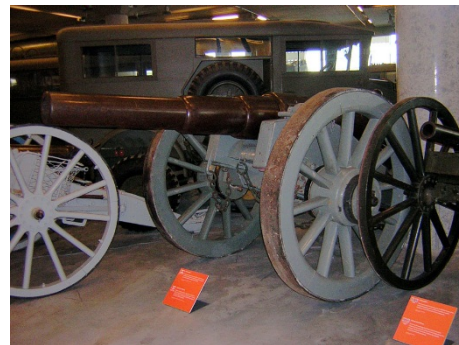
Weight of gun: 1,782 kg (3,920 lb)

Rate of fire: rounds/min

Maximum range: 3,472 m (3,800 yd)

Projectile weight: 18.7 kg (41.2 lb)

Ammunition types: Solid shot, shrapnel, and case



See *British Armstrong 6-pounder 3-cwt Rifled Breech-loading Gun* for general details on the Armstrong gun.

History

The 40-pounder Armstrong rifled breech-loading gun was designed as a broadside gun for naval ironclad warships. It was the first breech-loader to be introduced in sizeable numbers in the British navy. Mounted on a field carriage (like the CWM artefact) for coastal defence and garrison artillery, some guns remained in British service until about 1880. The guns were found to be inadequate in field use, because of difficulties in sealing the gas in the breech. In 1865, a committee decided that the rifled muzzleloader was superior to the Armstrong guns and many Armstrongs were converted to muzzleloaders. Many of those that were not converted found their way to the colonies.

Four 40-pounders arrived in Canada in 1882 and were used to train garrison batteries in Toronto and Montreal. Two more guns arrived in 1887 and were assigned to the artillery in Charlottetown, PEI.

The CWM artefact is presumably one of the four guns received in 1882. The barrel was manufactured at the Elswick Ordnance Company (England) in 1862, but the carriage is a reconstruction – although it may retain parts of the original carriage.

CWM 19690031-001

Canadian Rocket Projector No. 8 Mk I “*Land Service Mattress*”

Used by Canada: 1944 – 1945

Technical Data (Knight. *The Land Mattress in Cdn Svc.*)

Weight of Launcher: 1,118 kg (2,464 lb)

Diameter of warhead: 12.7 cm (5 in)

Maximum ground range: 7,538 m (8,250 yd)

Projectile weight: 13.1 kg (29 lb)

Ammunition type: High explosive



History

Officially known as the Projector, Rocket, 3-inch, Number 8, Mark 1, the Land Mattress was a unique Canadian weapon. A British officer invented it, but when the British Army took no interest, the Canadian Army in Britain took over its development. In nine weeks, the first ten launchers were constructed “for trials” using research funds and 10,000 rounds of ammunition assembled. They were then used in operations.

The rocket was a combination of surplus 76-mm (3-inch) Royal Air Force rocket motors, surplus Royal Navy warheads, and an army fuse that had been scrapped for safety reasons. Canadian Base Workshops constructed the adapters to fit the pieces together. The rockets were hand-assembled by the gunners in the firing battery, mixing parts until they found ones that would fit together. In terms of effectiveness, each rocket was roughly equivalent to a medium artillery shell from a 5.5-inch gun. A salvo from one launcher had the equivalent impact of two medium regiments, and the battery equalled 16 medium regiments. Each launcher fired its 32 rounds in 8 seconds, followed by about 15 - 30 minutes to reload.

The launcher was used by 1 Rocket Battery, RCA, which was a small cadre of officers and NCOs who were superimposed on an existing under-employed light anti-aircraft battery who carried out the work. The battery carried out their first “operational trial” against open-topped gun positions at Flushing on 1 November 1944. They supported every major offensive carried out by the 1st Canadian Army for the rest of the war.

The infantry were very happy with the results. The First Polish Division credited the Land Mattress with the success of their attack on Breda-Moerdijk from 6-8 November 1944. Several full battery salvos (up to 382 rounds each) were fired into the German positions during the attack. The Germans had 150 killed and 400 captured, while the Poles had twelve casualties.

The “trial” launchers had 32 tubes. A second production batch had only 30 tubes, and the CWM artefact is one of this group.

CWM 19940001-019

Canadian 20-mm Mk I Polsten Cannon on Quadruple Mounting C Mk I

Used by Canada 1944 – 1950s

Technical Data (DND)

Calibre:	20 mm (0.79 in)
Weight of Polsten gun:	57.2 kg (126 lb)
Total weight:	3,134 kg (6,895 lb)
Traverse:	360 degrees
Rate of fire:	450 rounds/min (cyclic)
Maximum AA Ceiling:	2,000 m (6,630 ft)
Projectile weight:	0.123 kg (0.272 lb)
Ammunition types:	HE, tracer, incendiary, armour-piercing



History

The John Inglis Company designed the quadruple mounting for the Polsten 20-mm cannon in 1942. After firing trials and road, tracking, and movement trials in 1943, the prototype was sent to the UK, where the British trials were very successful. The mounting was adopted for use by the Canadian Army and entered production in 1944. In the final analysis, however, the 20-mm gun was not widely used during the Northwest Europe campaign, because of the Allied air superiority. The gun was used in the ground role.

The mounting was powered by a 5-horsepower gasoline engine and could be operated using hydraulic power or manually. Using hydraulics, it could rotate one complete revolution in six seconds. Each gun was fed from a 60-round drum magazine weighing 29 kg (64 lb). Magazines could be changed easily. The armoured shell formed the frame structure of the mount and protected the gunner. The whole assembly was mounted on a wishbone trailer. The sights were either reflecting or tachymetric (speed measuring). Approximately 441 of the mountings were manufactured.

The Polsten cannon was a simplified version of the Oerlikon 20-mm cannon and fired the same ammunition. Canada manufactured 10,000 Polsten cannon during the war.

The 20-mm gun was removed from service after the war because of its low hitting power, the short firing time (8 seconds) which was limited by the 60-round magazines, and the frequent stoppages of the Polsten guns that were never really eliminated.

CWM 19600010-001

Canadian 155-mm C1 Towed Howitzer

Designed in America. Also produced in Canada

Used by Canada 1954 – 1970

Technical Data (DND)

Detachment (Crew):	ten
Calibre:	155 mm (6.1 in)
Weight of gun:	5,772 kg (12,700 lb)
Rate of fire:	2 rounds/min (sustained)
Maximum range:	15,076 m (16,500 yd)
Projectile weight:	37 - 45 kg (85 - 100 lb) depending on type
Ammunition types:	High explosive, smoke, illumination, and others



History

The C1 155-mm Towed Howitzer is an American M1 howitzer on M1A2 carriage manufactured under licence in Canada by Sorel Industries in Sorel, Quebec. The howitzer uses separate-loading ammunition (the projectile is loaded and rammed into the chamber, after which the propellant charge is loaded and the breech is closed). A small primer (that looks like a blank rifle cartridge) is fitted into the breech and the C1 is ready to fire. On firing the barrel recoils through the sleeve – the outer part of the barrel is a machined surface. It can be fired from the wheels, but normally, it is raised onto the firing jack at the front under the shield.

Canada manufactured at least 180 C1s in the mid-1950s for the Canadian Army and for other NATO nations. The howitzer was removed from service with the introduction of the M109 self-propelled howitzer in late 1968.

The CWM has two artefacts. Howitzer 00-34414 (manufactured in 1955, carriage number CDN 5, breech block number SIL 12) was proof-fired at Nicolet, Quebec, on 3 September 1956, and served with the 3rd Independent Medium Battery (Militia) in Kingston, Ontario, until 1964.

Howitzer 00-34400 (manufactured in 1956, carriage number CDN 166, breech block number SIL 179) was proof-fired at Nicolet, Quebec, on 8 November 1957 and served in “G” troop, “Z” Battery, from 1958 until 1966 when the battery was disbanded. During this time, it fired more than 1,600 rounds. The battery was part of 2 RCHA and later 3 RCHA in Winnipeg, Manitoba. In 1964-65, the author was the Gun Position Officer in “G” Troop, and 00-34400 was one of my guns.

CWM 19960020-001

French 75-mm M1897 Field Gun

Used 1897 – 1940s

Technical Data (Hogg. *Allied Artillery of World War I.*)

Detachment (Crew):

Calibre: 75 mm (2.95 in)

Weight in action: 1,138 kg (2,504 lb)

Rate of fire: up to 20 rounds/min

Maximum range: 6,860 m (7,500 yd)

Projectile weight: 5.55 kg (12.2 lb)

Ammunition types: High explosive, smoke, illumination, and others



History

The “French 75” was the first fully integrated quick-firing gun, and in 1897, it was definitely world-class. Its design incorporated many innovative features. It had a recoil mechanism that absorbed the energy of the gun on firing and returned the barrel to its firing position without the carriage moving to the rear. With previous guns, the whole carriage moved to the rear on firing, and had to be pushed back up into position for the next shot. This made consistent aiming between rounds almost impossible and was a major source of exhaustion for gun crews. The M1897 had a special safety mechanism that prevented the breech from opening in the event of a hang-fire (the propellant not being ignited). Its quick-acting breech and fixed ammunition (the shell and propellant were fixed to a brass cartridge case) allowed fast loading and gave a good rate of fire. It had an automatic fuse-setter for shrapnel shells.

But despite considerable mythology, by the beginning of the First World War, it was out-performed by its competitors, such as the British 18-pounder and the German 77-mm 96nA, which both out-ranged the M1897 and fired heavier shells. By the end of the First World War, France had manufactured more than 17,000 M1897 guns. Some were upgraded in the 1930s, and it remained the main field gun in the French, American, Polish, and a number of other armies until the 1940s.

The French 65th Field Battery used the CWM artefact. This type of gun was captured by the Germans in 1940 and used against the Canadians at Dieppe in 1942.

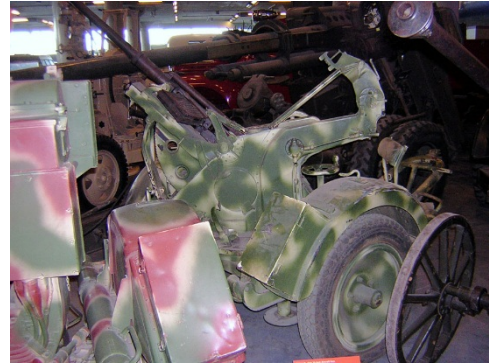
The bulky attachment at the muzzle was to support the gun during recoil. The barrel has a long recoil, putting great weight on the elevating system at full recoil. To support the barrel, the muzzle has a roller system that slides under a flange to support the barrel and relieve the load. The rollers are covered by a sliding cover when the gun is in battery.

CWM 19390002-083

German 2-cm Flugabwehrkanone (Flak) 30 Anti-aircraft Gun

Used 1934 - 1945

The 20-mm (0.79 in) Flugabwehrkanone 30 anti-aircraft (AA) gun was designed in the 1920s and 1930s and entered service in 1934 in the German Navy, and in 1935 with the Luftwaffe. The gun was really a heavy machine gun, fed from a 20-round box magazine, and was capable of single shot and automatic fire.



The mounting was highly mobile trailer, and the gun could easily be detached and placed on the ground. The gun was also mounted on railroad cars and trucks. Its first sight was complex and difficult to manufacture and maintain and was replaced by a simple open sight. Although some Flak 30 remained in service throughout the Second World War, the Flak 38 replaced most of them early in the war.

CWM

Technical Data [Flak 38 in brackets where different] (Hogg – German Artillery of World War II)

Length of gun:	2.300 m (90.55 in) [2.251 m (88.62 in)]
Weight in action:	483 kg (1,065 lb) [406 kg (895 lb)]
Rate of fire:	120 rounds/min (practical) [180-220 rounds/min]
Maximum ground range:	1,600 m (1,750 yd)
Maximum AA ceiling:	2,000 m (6,562 ft)
Projectile weight:	0.305 kg (0.67 lb)
Ammunition types:	High explosive, armour-piercing

German 2.8-cm s PzB 41 Tapered Bore Anti-tank Gun

Used 1940 - 1944

Technical Data (Hogg – German Artillery of World War II)

Crew:	two or three
Calibre:	28 mm (1.1 in) tapering to 20 mm (0.79 in) at the muzzle
Weight in action:	229 kg (505 lb)
Muzzle velocity:	1,400 m/sec (4,593 ft/sec)
Maximum effective range:	800 m (875 yd)
Rate of fire:	8 – 10 rounds per minute
Weight of projectile:	131 gm (4.62 oz)
Armour penetration:	66 mm (2.60 in) at 0 degrees incidence at 500 m (547 yd)
Ammunition types:	Armour-piercing, high explosive



History

The barrel of the Schwere Panzerbüchse 41 (s PzB 41) tapers from a diameter of 28 mm (1.1 in) at the breech to 20 mm (0.79 in) at the muzzle. The ability of a solid shell to penetrate armour depends on the muzzle velocity of the gun. In a tapered bore, as the projectile moves down the barrel, it is squeezed to a smaller diameter, increasing the muzzle velocity and the armour penetration of the shell.

Officially named a heavy anti-tank rifle, the s PzB 41 was the first gun with a tapered bore to enter service in the Second World War. It was effective against the relatively lightly-armoured tanks at the beginning of the war, but its small calibre was inadequate against the heavier armour of the later Allied tanks. Because of a shortage of tungsten, which was needed for its ammunition, the gun was phased out by 1944.

It was normally carried on a wheeled trailer. The wheels were only for manhandling the gun into position. Once in the firing position, the wheels were removed and the gun stood on a pedestal for firing. It could be broken down into five loads for man packing or for mule transport. There was an airborne version with a light tubular frame carriage.

Some people consider the s PzB 41 to be the first German secret weapon, because the British were totally unaware of its existence until it was encountered in the Western Desert in 1941. At first, British experts did not believe the reports because they did not think that the technology was feasible.

CWM 19500010-007

German 3.7-cm Panzerabwehrkanone (Pak) 36 Anti-tank Gun

Used 1936 – 1945

Technical Data (Gander, Terry. German Anti-tank Guns 1939-1945. London, Altmark, 1973.)

Crew: six
 Weight in action: 432 kg (953 lb)
 Rate of fire: 8 - 10 rounds per minute
 Effective range: 550 m (600 yd)
 Weight of projectile: 0.68 gm (1.50 lb)
 Ammunition types: AP, HE, hollow charge



History

The 37-mm Panzerabwehrkanone (Pak) 36 was first issued in 1936, and was field-tested in the Spanish Civil War. the standard German anti-tank gun at the beginning of the Second World War. More than 20,000 guns had been issued by the middle of 1941. Although weak in penetration, it more than made up for this by its mobility. It was also sold to the Soviet Union in reasonable quantities (before 1940). Normally towed by a light truck, its crew could manhandle the gun with special leather straps. Later, as it was outmatched by improvements in Allied tanks, a spigot bomb was issued. Its armour penetration with standard AP ammunition was 49 mm (1.9 in) at 30° at 365 m (400 yd), and 180 mm (7.09 in) with the spigot bomb, which had an effective range of only 300 m (328 yd). The Pak 50 replaced the Pak 36 starting in 1941.

CWM 19700094-002

German 7.5-cm Leicht Geschütz LG 1 (LG 40) Recoilless Rifle

Used 1940 - 1945

Technical Data (Hogg – German Artillery of World War II)

Calibre: 7.5 cm (2.95 in)
 Weight in action: 145 kg (320 lb)
 Maximum range: 6,800 m (7,434 yd)
 Weight of projectile: 5.83 kg (12.86 lb) High explosive

History

A recoilless rifle vents propellant to the rear of the gun on firing, removing the need for a complicated system to absorb the recoil. However, this results in a large blast of debris behind the weapon, which makes concealment difficult. The 75-mm Leicht Geschütz 1 (LG 1, also known as the LG 40) was the first recoilless rifle to be introduced into German service. It was built in four parts for easy dropping by parachute, but most of the guns were used by mountain troops. Approximately 450 guns were produced.



CWM 19500032-030

German 7.5-cm Krupp Quick-firing (QF) Field Gun

Used 1895 –

Technical Data (South African Military History Society)

Calibre:	7.5 cm (2.95 in)
Length of gun:	88.4 cm (34.8 in)
Weight in action:	5,294 kg (11,648 lb)
Maximum range:	4,020 m (4,400 yd)
Projectile weight:	5.0 kg (11 lb) shrapnel
Ammunition type:	Common shell (high explosive), shrapnel



History

Just as the Spanish Civil War provided a testing ground for German and Italian equipment before World War II, so did the South African War provide a similar opportunity for proving contemporary French and German Artillery. These guns were superior to those in use at the time by the British Army. At the beginning of the war, Boer guns frequently outranged British Artillery, and British gunners were surprised at the way in which the Boers moved their heavy guns about the countryside. The Krupp guns were identifiable by their horizontal sliding block breech mechanism. The sliding block method allows a rapid rate of fire, and is still in use in modern QF equipments. The Krupp ammunition was said to be reliable. Shrapnel was of cast iron and held 103 bullets.

The Boers used the CWM artefact during the Boer War in South Africa. After the war, the gun was brought to Canada and was displayed on Parliament Hill until 1906.

CWM 19830573-008

German Horse-drawn Artillery Observation Wagon

Used - late 1800s – 1918

History

The identification of the artefact is in some dispute. The CWM website identifies it as a horse-drawn artillery limber. However, it is clearly identified as a Beobachtungswagen für feldartillerie (observation wagon) in David Nash, *German Artillery 1914-1918*, London, Altmark Publishing Company, 1970, page 22. The wagon carried a tripod structure, on which was mounted a stand with an armoured shield for an observer. The stand could be mounted on the ground, or on the wagon itself, in several different heights depending on the situation. Field telephone equipment was carried in the wagon and telephone line could be paid out from the rear of the wagon. The reference has several good photographs. Each battery of German field artillery had one observation wagon. Six horses towed the wagon.



CWM 19390002-102

German 7.5-cm Leichtes Infanteriegeschütz 18 Infantry Gun

Used 1927 - 1945

Technical Data (Hogg – German Artillery of World War II)

Weight in action: 400 kg (882 lb)
 Maximum range: 3,375 m (3,690 yd)
 Projectile weight: 6.0 kg (13.23 lb)
 Ammunition type: HE, hollow charge, smoke



History

The infantry gun was operated by infantrymen, providing them with fast, guaranteed, fire support. The German army retained their infantry guns throughout the Second World War, although they were gradually replaced with mortars. The IG 18 was one of the first guns issued to the German army after World War I. It was mechanically unique, in that the rear end of the barrel lifted clear of the breech for loading, similar to the mechanism of a shotgun. The wooden spoked wheels indicate that this gun was normally horse-drawn. A lighter version could be broken into six mule-pack loads or ten man-pack loads for use by mountain troops.

CWM 19390002-080

German 8.8-cm Raketenwerfer 43 “Püppchen”

Used 1943 - 1945

Technical Data (US War Department. TM-E 30-451, *Handbook on German Military Forces, 1945.*)

Weight: 122 kg (270 lb) approximately
 Maximum range: 640 m (700 yd)
 Weight of projectile: 2.6 kg (5.8 lb)
 Ammunition type: Hollow charge (anti-tank)



History

The 88-mm (3.5-in) Raketenwerfer (rocket grenade thrower) 43, also known as the “Püppchen”, fired a rocket projectile from a closed breech to get increased range. The *Püppchen* was mounted on a two-wheeled, single-trail carriage with protective shield with no recoil mechanism. The recoil was completely taken up by the trail and spade. It has a simple hinged breechblock with striker mechanism. No traversing or elevating wheels are provided on the carriage; the gun must be held at the required elevation by a spade handgrip and manually traversed on a traversing slide. The weapon has a front sight and an adjustable rear sight mounted on the barrel. The rear sight is graduated from 180 to 700 m (195 to 765 yd). The wheels could be removed to lower the weapon, and skis could be fitted for operation in snow. It was not widely used because it was expensive, and did not significantly increase the range of the earlier launchers. Approximately 100 were produced and issued to troops.

CWM

German 15-cm s FH m/02 Heavy Field Howitzer

Used 1903 – 1918

Technical Data (Jäger. *German Artillery of World War 1*)

Weight in action: 1,942 kg (4,274 lb)
Rate of fire: 1 round in 2 minutes
Maximum range: 6,800 m (7,450 yd)
Weight of HE projectile: 38.6 kg (85 lb)
Ammunition type: high explosive



History

The 150-mm schweres Feldhaubitze m/02 (s Fh m/02) began life in 1893 as a rigid-mount gun (on a field carriage with no recoil system). In 1899 Krupp used the barrel as the basis for a gun with a modern recoil system, resulting in the s Fh m/02. It was the first gun in the German Army with a modern recoil system. It entered service in June 1903. At the beginning of the First World War, Germany fielded 416 of these heavy howitzers. It took an average of 17-18 minutes for a battery to deploy from the march to firing the first round. The gun could be converted into two loads for mountain use. The CWM artefact was manufactured in 1916, was shipped to Canada as a war trophy in 1919 and spent 75 years in Dundurn Park in Hamilton, Ontario.

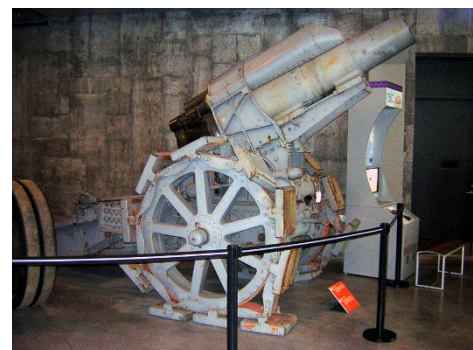
CWM 19940038-002

German 21-cm Langer Mörser Heavy Howitzer

Used 1916 - 1942

Technical Data (Jäger. *German Artillery of World War 1*)

Calibre: 211 mm (8.3 in)
Weight in action: 7,555 kg (15,860 lb)
Rate of fire: 1 round in 2 minutes
Maximum range: 10,200 m (11,160 yd)
Weight of HE projectile: 114.5 kg (252 lb)
Ammunition type: HE, concrete-piercing



History

Although Germany called the 21-cm Langer Mörser a mortar, it was closer in design to a heavy siege howitzer. Based on an 1898 mortar, it was redesigned by Krupp in 1910 and again in 1916 to increase its range while limiting the increase in weight. Because of its weight, at first it was divided into two loads for horse transport. The CWM artefact is a later carriage intended to be towed by a vehicle or tractor. The large pads on the wheels reduced the ground pressure and eased the load. The 1910 and 1916 versions were among the most important German heavy howitzers of the First World War and together fired more than seven million shells. Some were modernized in 1934-35, but only 28 remained at the beginning of the Second World War.

CWM 19940038-001

German 21-cm Nebelwerfer 42 Rocket Projector

Used 1942 - 1945

Technical Data (US War Department. TM-E 30-451, *Handbook on German Military Forces, 1945*.)

Calibre: 21.45 mm (8.45 in)
Weight in action: 1,100 kg (2,425.5 lb)
Maximum range: 9,150 m (8,600 yd)
Weight of projectile: 113 kg (248 lb)
Ammunition type: High explosive, smoke



History

The five-barrelled 21 cm "Nebelwerfer" 42 rocket projector entered service in 1943. The five barrels are mounted on a split trail carriage with a supporting leg at the front to improve stability on firing.

All five rockets could be fired in eight seconds, and three salvos could be fired in less than five minutes. In flight, the rockets made a distinctive sound, resulting in the system being called "Moaning Minnie" by Canadian troops.

CWM 19500013-001

German 60-cm Light Searchlight

Used 1939-1945

History

The 60-cm (23.5 inch) light searchlight used a 60-cm diameter glass parabolic reflector that provided a 250-mm focal length. Powered by an 8-kilowatt generator, its high current density arc lamp produced 135 million candlepower. This gave a focussed beam range of 4,500 m at 1,500 m height (5,000 yd at 5,000 ft), or a dispersed beam range of (3,500 yd). A Venetian blind type shutter covered and exposed the light. The light was mounted on a two-wheeled trailer, similar to the 20-mm Flak mounting.



A light truck carrying the crew and generator towed the searchlight. The five-man crew consisted of the section commander, controller (who aimed the light), attendant (who focussed the beam), generator attendant, and driver.

Searchlights were used in the anti-aircraft role, but normally in the rear areas and not in the front lines. They could also be used to support attacks and provide general illumination by reflecting the light off clouds.

CWM

German Minenwerfer (Trench Mortars)

Used 1914 – 1918

German minenwerfer (trench mortars) were considered infantry weapons and were issued to infantry regiments and battalions in the First World War. They could be broken down into easily-carried loads. The minenwerfer sat on a platform (or base plate) and could be emplaced in a narrow trench. They were fired at a high trajectory, and their shell dropped almost perpendicularly, so fire could be delivered close to friendly troops. However, their short range forced the minenwerfer to be placed close to the front lines. The ammunition supply then became a problem because the carriers could be interdicted by enemy fire – especially from machine guns. Germany produced a number of minenwerfer in calibers ranging from 76-mm to 240-mm.

The CWM has several minenwerfer in the collection.

German 24-cm “*Albrecht*” Trench Mortar

The *Albrecht* mortar is unusual in that the main structure is wood, with a thin metal liner inside the barrel and reinforcing metal wires and bands wrapped around the barrel. The mortar can be traversed about 30 degrees right and left by sliding the front support on a rail. Elevation changes are accomplished using a hand wheel on a threaded rod. Once laid, the mortar would be locked in position by tightening nuts on the frame. Accuracy was probably very low and the range was limited from 50 to 550 m (54 to 600 yd).

CWM 19390002-138



German 9.1-cm *Lanz* Smoothbore Minenwerfer

The *Lanz* Minenwerfer was a crude pattern of trench mortar that quickly became obsolete. Its main advantages were simple construction, and light weight. The entire weapon platform had to be lifted and turned in order to traverse the mortar.

CWM 19940001-018



German 7.6-cm M1916 Light Minenwerfer on Flat-trajectory Carriage

Technical Data (Notes on German Ordnance for the Collector 1841-1918)

Weight in action: 249 kg (550 lb)
Elevation: 0 to 38 degrees
Range (mortar): 273 m (300 yd) to 1,300 m (1,422 yd)
Range (flat trajectory): 910 m (995 yds)
Ammunition types: High explosive, gas, message



History

Unlike modern mortars, the German minenwerfer in the First World War had a recoil-absorbing mechanism. They were muzzle-loaded, and the propellant charge was contained in the base of the projectile, with the gas expanding through the bottom of the shell. The short barrel and the resistance imposed by the rifling did not allow loading the projectile to generate enough force to ignite the propellant so a simple firing mechanism was fitted. The trigger had to be cocked and fired by hand after loading.



On its original platform mounting, the M1916 New model Light Minenwerfer could not fire at an angle of elevation of less than 34 degrees. Early in 1917, the Germans modified the carriage to allow flat-trajectory fire. This was an attempt to replace the heavier (and more expensive) field guns that were needed to fight tanks in the front trenches. Because of the need to move the trail, traversing the weapon was more complicated than on its original base plate.

The CWM has two M1916 minenwerfers. The flat-trajectory carriages are of different construction, but are of similar design and function.

CWM19390001-650 and CWM 19930039-001

Italian 105-mm L5A1 Pack Howitzer

Used 1957 – Present. Used by Canada

Technical Data (DND)

Detachment (Crew):	six
Calibre:	105 mm (4.1 in)
Weight of gun:	1,313 kg (2,889 lb)
Depression/elevation:	-5 to +64 degrees
Traverse:	18 degrees left and right
Rate of fire:	3 - 8 rounds/min (normal – rapid)
Maximum range:	10,890 m (11,000 yd)
Projectile weight:	15 kg (33 lb)
Ammunition types:	High explosive, smoke, high explosive anti-tank, high explosive squash head, illumination, and others



History

The L5A1 was designed and built in Italy as a lightweight 105-mm howitzer. It is manually operated, and fires standard NATO 105-mm artillery ammunition. It can be broken down into twelve loads for transportation by air or by mules. It was air-portable, air-droppable and could be slung underneath the Bell UH1 Iroquois helicopter. It could be towed by a jeep or carried as a portee in a 2½-ton truck. The wheels can be fitted in two positions, the normal field position with the wheels over-slung, and the anti-tank position with the wheels under-slung.

Production began in 1957 and ceased in 1984 with some 4200 weapons delivered. The weapon has seen action in many combat areas, including by the British in South Yeman and Borneo, and New Zealand in South Vietnam. Argentina used the weapon in the 1982 Falklands campaign.

Canada purchased the L5 in 1968 to equip light artillery batteries and the airborne battery. Being lightly constructed, the gun had more than its share of maintenance problems (like shedding the wheels and shooting the muzzle brake off the end of the barrel). The CWM artefact was serial no. 70-34900 and is missing its muzzle brake.

CWM 19990197-001

Japanese 20-mm Type 98 (1938) Anti-aircraft/Anti-tank Cannon

Used 1938 - 1945

Technical Data (US War Department. *Handbook on Japanese Military Forces*, 1944.)

Weight in action: 380 kg (836 lb) without wheels

Rate of fire: 120 rounds/min

Maximum AA ceiling: 3,655 m (12,000 ft)

Maximum ground range: 4,984 m (5,450 yd)

Ammunition types: HE (tracer), AP (tracer)



History

The Type 98 20-mm anti-aircraft/anti-tank cannon was a light dual-purpose weapon. It was the standard mobile anti-aircraft gun used by the Japanese Army in the Second World War. Armour-piercing ammunition was available, but it was too small calibre to be effective as an anti-tank gun. The 2-wheeled mount could be towed by a vehicle, manhandled, or broken down into mule or horse-pack loads. It could be fired from its wheels, but normally the outriggers were deployed to give a more stable platform with complete 360-degree traverse. An experienced crew could prepare the gun for anti-aircraft firing from its travelling configuration in less than three minutes. The gun was fed from a 20-round box magazine.

CWM 19500001-001

Japanese 75-mm Type 41 (1908) Pack Howitzer

Used 1938 - 1945

Technical Data (US War Department. *Handbook on Japanese Military Forces*, 1944.)

Weight in action: 545 kg (1,200 lb)

Maximum range: 7,130 m (7,800 yd)

Projectile weight: 5.67 kg (12.5 lb)

Ammunition types: High-explosive, armour-piercing, shrapnel, incendiary, high-explosive anti-tank (HEAT)



History

The Type 41 was patterned from a pre-1914 German Krupp gun, and issued in 1908 as a mountain or pack gun. In 1935, the Type 41 was issued to Japanese infantry regiments as a direct support weapon.

A trained crew could easily disassemble the gun into six 90 kg (200 lb) loads in three to five minutes. Each load could be carried by a two-man team using a pole.

CWM 19500010-009

Soviet 14.5-mm Vladimirov ZPU-4 Anti-aircraft Gun

Used 1949 - Present

Technical Data (Frank N. Schubert and Theresa L. Kraus, General Editors. *The Whirlwind War, The United States Army in Operations Desert Shield and Desert Storm.*)

Crew: five
Calibre: 14.5 mm (0.57 in)
Weight in action: 1,818 kg (4,000 lb)
Rate of fire: 600 rounds/min (practical)
Maximum range: 1,400 m (1,530 yd)
Ammunition types: High explosive, armour-piercing



History

The ZPU-4 is a quadruple anti-aircraft version of the basic Soviet 14.5mm machine gun. Introduced in 1949, it was used in Korea and was later considered the most dangerous opposition to U.S. helicopters in Vietnam. Iraqi forces used it during Operation Desert Storm. The CWM artefact was captured from the Iraqi army during the Gulf War of 1990. It is missing the machine guns.

CWM 20000103-001

Soviet 122-mm Heavy Mortar M1943

Used 1938 - 1953

Technical Data

Calibre: 122 mm (4.72 in)
Weight in action: 280.1 kg (617lb)
Rate of fire: 15 rounds/min
Maximum range: 5,700 m (6,234 yd)
Projectile weight: 16 kg (35.3 lb)
Ammunition types: High explosive, smoke



History

The 120-mm Model 1938 mortar was one of the best mortar designs of the Second World War. It combined a heavy projectile with a good range, and a system that was mobile and easy to put into action. The Germans were sufficiently impressed that they copied the design. It was towed on a two-wheeled limber and normally accompanied by a two-wheeled ammunition cart carrying 20 rounds of ammunition. The 1943 version was similar to the 1938 version, except that it used only a single shock absorber on the bipod mount.

CWM 19660016-008

Soviet 76.2-mm ZIS-3 Model 1942 Divisional Gun

Used 1942 - 1970

Technical Data (Artillery of RKKA)

Crew: five
 Weight in action: 1,200 kg (2,640 lb)
 Rate of fire: up to 25 rounds/min
 Maximum range: 13,290 m (14,545 yd)
 Projectile weight: 6.5 kg (14.3 lb)
 Ammunition types: HE, smoke, AP, shrapnel



History

Design of the 76.2-mm ZIS 3 Model 42 field gun began in May 1941. The gun consisted of a new barrel on the ZIS-2 gun carriage, with a muzzle brake that absorbed 30% of the recoil energy. The prototype passed its trials in July 1941. After the German invasion, Stalin ordered priority production of anti-tank guns, effectively prohibiting production of the ZIS-3, but the designer was able to secretly get an order placed. Officially, the ZIS-3 was accepted for service on February 12, 1942, and named the 76-mm Divisional Gun Model 1942, but because of the subterfuge, by that time, the Red Army already had at least 1,000 guns. Eventually, about 48,000 ZIS-3 were manufactured. After the Second World War, it remained in service in the Warsaw Pact and other countries. It was still in service in Yugoslavia in 1990.

CWM 19660016-005

Soviet 107-mm B-11 Recoilless Anti-tank Gun

Used 1955 - 1980

Technical Data

Crew: five
 Firing weight: 240 kg (528 lb)
 Rate of fire: 5-6 rounds/min
 Effective anti-tank range: 450 m (492 yd)
 Projectile weight: 7.5 - 8.5 kg (16.5 - 18.7 lb)
 Armour penetration: 380 mm (15 in)
 Ammunition types: High explosive, high explosive anti-tank (HEAT)



History

The B-11 is a smoothbore recoilless anti-tank weapon, normally used in infantry battalions. Easily towed by a jeep-type vehicle, such as the Soviet UAZ 4x4 truck, the gun can be fired with its wheels attached, or on the ground with the wheels removed. The B-11 was widely used in by the Soviet Union and other Warsaw Pact and Soviet-allied nations. Egypt used this particular gun in the 6-day Arab-Israeli war in 1967.

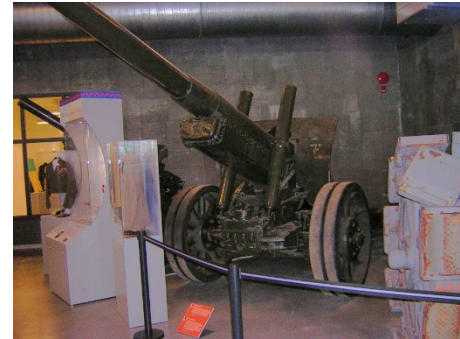
CWM 19760347-001

Soviet 122-mm Gun A-19 Model 1931/1937

Used 1938 - 1945

Technical Data (From plaque on gun – does not agree with other sources)

Crew: nine
Weight in action: 7,133 kg (15,693 lb)
Rate of fire: 5-6 rounds/min
Maximum range: 20,400 m (22,318 yd)
Projectile weight: 25 kg (55 lb)
Ammunition types: High explosive, smoke



History

The A-19 guns were used in Soviet corps artillery and in supreme command reserve formations during the Second World War. At the beginning of the war more than 1,200 A-19s were in Soviet service, and almost 600 remained at the end of the war. Approximately 200 were captured and used by the Germans, including some in France that were used against Canadian troops. The North Koreans also used the A-19 in the Korean War.

CWM 19660016-007

Soviet 122-mm Howitzer M1938 M30

Used 1938 - Present

Technical Data (Artillery of RKKA)

Crew: eight
Weight in action: 2,450 kg (5,390 lb)
Rate of fire: 15 rounds/min
Maximum range: 11,800 m (12,910 yd)
Projectile weight: 21.76 kg (47.9 lb)
Ammunition types: High explosive, smoke



History

The 122mm howitzer M-30 (M1938) was introduced into the Soviet Army shortly before the Second World War to replace the many obsolescent howitzers that were still in service. The Soviet Union produced more than 17,800 M30 howitzers during the Second World War. After the war it became the standard divisional howitzer in the other Warsaw Pact nations and was sold to many other countries. Some remain in service today.

CWM 19660016-006

Section 2 - Armoured Vehicles

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Department of National Defence documents.

General Notes:

The CWM does not have a Tiger tank. There is no Tiger tank in Canada.

The CWM has a Panther tank, which is currently (2007) in the restoration workshop.

American M3 Lee Medium Tank

Used 1941 – 1945. Used by Canada 1942 - 1943

Technical Data (Forty. *M4 Sherman*.)

Crew: six (commander, 37-mm gunner, and loader in the turret; 75-mm gunner and loader in the sponson; driver)

Gross weight: 27,955 kg (61,500 lb)

Maximum speed: 34 km/hour (21 mph)

Range: 192 km (120 miles)

Maximum fording: 1 m (40 in)

Engine: Wright Continental R975 9-cylinder gasoline

Armour: up to 55 mm (2 inches)

Armament: 75-mm gun, 37-mm gun, three 7.62-mm (0.30-in) machine guns



History

America developed the M3 tank as a stopgap measure in 1940, after Germany had conquered France and Britain had withdrawn from the continent at Dunkirk. The urgency of the situation demanded that they design the tank and the production facilities, and go into production at the same time.

For the time, the 75-mm gun was a powerful gun, but it was mounted in a sponson in the hull. It had limited traverse and, in order to use it, a large part of the tank had to be exposed. The primary anti-tank gun was the 37-mm gun in the turret, which was inadequate against the newer German Mark III and Mark IV tanks. Nevertheless, the tank performed well in the North African campaign and in the Far East, where it was generally superior to the Japanese tanks.

About half of the M3 tanks that were produced were manufactured for the British army and they insisted a number of changes, especially to the turret. They named their version the M3 *Grant* tank. The Canadian Army used some M3s in training, but never used it in combat. Montreal Locomotive Works used the hull and suspension of the M3 as guide in their development of the Canadian *Ram* tank. A total of 6,258 M3 tanks were built.

The CWM artefact, which was manufactured in 1942, was used in the 1995 remake of the 1943 film “Sahara” starring Humphrey Bogart. The actor James Belushi starred in the movie and signed the inside of one of the doors of the tank.

CWM 20000230-003

American M4A2 (76) W HVSS *Sherman* Medium Tank (M4A2E8)

Used by Canada 1947 - 1967

Technical Data (Marteinson and McNorgan)

Crew:	five (commander, gunner, loader, driver, co-driver)
Gross weight:	33,294 kg (73,400 lb)
Maximum speed:	40 km/hour (25 mph)
Range:	160 km (100 miles)
Engine:	GMC 6046 375 hp 12-cylinder twin in-line diesel
Armour:	up to 75 mm (3 inches)
Armament:	75-mm (3-inch) gun, two 7.62-mm (0.30-in) machine guns, 12.7-mm (.50-in) machine gun on turret



History

The M4 "Sherman" Tank entered production in 1941, and by the end of the Second World War was the main combat tank of the Western Allied Armies. In 1947, the Canadian Army purchased 294 M4A2 (76) W HVSS *Sherman* Medium Tanks (commonly, if incorrectly, called the M4A2E8. The Americans called any *Sherman* with the HVSS suspension an "Easy 8"). It served both regular and militia units in the Royal Canadian Armoured Corps until replaced by the *Centurion* tank in the mid-1950s, and remained in service with the Reserves until the late 1960s.

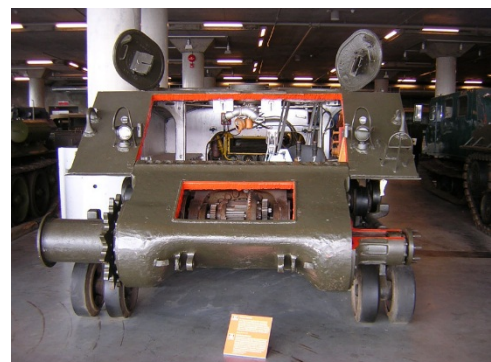
This version had the Horizontal Volute Spring Suspension (HVSS) that was introduced to the Sherman family in 1944, with wider tracks that resulted in greater mobility than earlier models. The bogie springs in the HVSS were mounted horizontally, rather than vertically as in the previous models. The 76-mm (3-inch) gun provided greater firepower than the standard 75-mm gun, but still fell short of the 17-pounder *Sherman Firefly*. The "W" indicated that the ammunition was stored in water-protected racks below the turret ring, which reduced the fire hazard if the tank was hit.

CWM 19990009-001

Sherman Tank Hull Cutaway Trainer

The cutaway trainer is used to train operators and repair technicians in the location, relationship, and functioning of the various components of the tank. Normally a trainer will be located at the Armoured Corps School and another at the Electrical and Mechanical Engineers school. There would also be a similar trainer for the turret systems.

CWM 19690034-001



American M24 *Chaffee* Light Tank

Used 1943 – 1980s. Used by Canada 1947 – 1952

Technical Data (from plaque on tank)

Crew:	five (commander, gunner, loader, driver, co-driver)
Gross weight:	16,320 kg (35,904lb)
Maximum speed:	56 km/hour (35 mph)
Range:	160 km (100 miles)
Engine:	twin Cadillac V8 110 hp water-cooled gasoline
Armour:	up to 37 mm (1.45 in)
Armament:	75 mm (2.95 in) M6 gun, two 7.6 mm (0.30 in) machine guns



History

Designed in 1943, the M24 was one of the outstanding light tanks of the Second World War. Its 75-mm gun, which was developed from an aircraft cannon, was almost as powerful as the gun in the *Sherman* tank, while its sloped armour gave it better protection than most tanks in its class. The engines were mounted on rails for easy maintenance, and a large plate in the glacis gave easy access to the final drive.

A large number of other vehicles were developed from the M24 chassis, including self-propelled guns and mortars, cargo carriers and engineer vehicles.

The Canadian Army purchased 32 M24 tanks in 1947. It served in Canadian reconnaissance regiments until the mid-1950s.

CWM 19680227-001

American M113A2 Armoured Personnel Carrier

Used by Canada 1964 – Present

Technical Data: (DND)

Crew:	two (commander, driver) plus up to 11 infantrymen.
Weight:	11,156 kg (24,600 lbs)
Engine:	GM model 6V53 6-cylinder water-cooled 215 hp diesel
Maximum speed:	67.6 km/hr (42 mph)
Range:	483 km (300 miles)
Armament:	7.62-mm machine gun
Armour:	up to 31 mm (1¼ in) Aluminium, Manganese and Magnesium armour.



History

The first M113 was produced in June 1960, but was converted to a diesel engine in 1964 and re-designated M113A1. The driver is on the front left, with the commander located centrally in the vehicle. Bench seats on each side accommodate five infantrymen with room for another in the middle. The normal means of entry/exit is the large hydraulically-operated ramp in the rear of the hull. External fuel tanks are mounted behind the tracks on either side of the vehicle. The M113A1 is amphibious, and in the water, is propelled by its tracks at a top speed of 3 mph. The front of the vehicle has a hinged splash plate, to stabilize the vehicle while swimming. The vertical cutters at the top front of the vehicle are to cut wires that are strung across the road and intended to decapitate the driver or crew commander. The Aluminium alloy armour protects the crew against small arms fire and shell fragments, but not a light anti-armour weapon nor the blast from a land mine. From 1964 to 1991, the Canadian Army bought a total of 1,143 M113A1s in many different variants. Many of them have been upgraded to the M113A2 and M113A3 versions, and some remain in service today.

The CWM artefact – Canadian Forces Registration 64-35000 – was the first M113A1 received by the Canadian Army in 1964. It was first used as a maintenance training aid in 4 Field Workshop, RCEME, being disassembled and rebuilt roughly every month for a year. It served honourably in Germany until 1992 when it went on the peacekeeping operation in Croatia. On 28 October 1992, it hit a Serbian TMA-3 anti-tank mine and was damaged beyond repair – two soldiers were injured in the incident. (photo from CWM web site).



CWM 20030358-018

Other American M113 Family Variants at the CWM

In addition to its primary function of carrying a section of mechanised infantry (10 men), the M113 was adapted for many other roles. The CWM collection includes specialist vehicles that were (and still are) used by the Canadian Army.

M113A2 Armoured Recovery Vehicle – Light (ARVL)

This vehicle is used in the unit vehicle repair and recovery sections. Two Electrical and Mechanical Engineering vehicle technicians are the normal crew. In addition to carrying out minor repairs, they have a heavy-duty winch in the vehicle to extricate bogged vehicles. The large blade at the back drops and acts as a spade to support the vehicle during recovery operations.

CWM



M113A2 Fitter's Vehicle CFR 66-35697

Mobile repair teams use this vehicle to repair broken-down or damaged light armoured vehicles in the field. They can carry out complicated and time-consuming repairs such as replacing engines, transmission, etc. Two or three Electrical and Mechanical Engineering vehicle technicians normally man the vehicle, which has a HIAB crane on the left side of the hull to lift heavy items (such as a complete engine). A large roof hatch allows a spare engine or other assembly to be carried inside the fitter's vehicle.

CWM 20030358-007



M113A2 Combat Engineer Vehicle CFR 92-10688

This vehicle was developed in Canada to provide a combat engineer vehicle for the Canadian Army. Combat engineers carry out tasks such as preparing defensive positions or breaching enemy obstacles, frequently under enemy fire. The vehicle has a dozer blade, and mounts an auger on the left side of the hull (which is stowed on the roof when not in use). The auger is used to drill holes for fence posts, barbed wire supports, or for explosives to crater roads and create obstacles. The dozer blade is used to remove rubble, clear roads, and generally maintain the mobility of the infantry and armoured forces. The vehicle carries a team of combat engineers with their portable equipment, stores, and explosives.

CWM 20030358-013



M577A2 Command Post

The M577 has served as brigade, battalion, and artillery command posts. The rear two-thirds of the hull is enlarged and the armour is raised to give a ceiling height of 190 cm (74 in), allowing the crew to stand up inside the vehicle. The working area contains radios, map boards, and folding tables, and can be expanded using an optional tent extension attached to the rear of the vehicle. The roof has communications antennae. When the engine is off, an auxiliary generator provides power. The vehicle is top-heavy.

CWM 20030358-008



M548 Cargo Carrier

The M548 is an unarmoured supply vehicle based on the M113A1 chassis. It has a 6-tonne payload, and a crew of four can fit into the cab. It has the cross-country capabilities of the M113A1, but its American designers chose to forego armour protection in favour of a larger payload. The M548 is transportable in C130 *Hercules* aircraft. A 7.62-mm machine gun can be mounted over the cab and operated from a hatch in the cab roof.

CWM 20030358-014



American T17E1 *Staghound* Armoured Car

Used by Canada 1943 – 1950s

Technical Data (Marteinson and McNorgan.)

Crew:	five (commander, gunner, loader, driver, co-driver)
Gross weight:	12,090 kg (26,600 lb)
Maximum speed:	88 km/hour (55 mph)
Range:	800 km (500 miles)
Engine:	two Chevrolet 97-hp 6-cylinder gasoline
Armour:	up to 44 mm (1.75 inches)
Armament:	37-mm (1.46-inch) M6 gun, two 7.62-mm (0.30-in) machine guns



History

The *Staghound* Armoured Car resulted from a joint British/American effort in 1942 to draw up specifications for an armoured car. There were two competing products and the GM car was selected, with the first vehicles produced in October 1942. The US subsequently decided that they did not need a car of this size and the total production of 2,000 cars was sent to Britain. Another 1,000 anti-aircraft variants (mounting twin .50-calibre Browning machine guns) were also manufactured.

The *Staghound* was designed for use in the desert, and even the British considered it to be a bit high for use in Europe. It was used by armoured car and reconnaissance regiments for short and long-range reconnaissance. It was also used to protect headquarters, escort convoys, and as a command vehicle for senior commanders. General Simmonds had two cars extensively modified as personal “chargers” (command vehicles).

The Royal Canadian Dragoons and the 12th Manitoba Dragoons used the *Staghound* in Italy and North-west Europe. It continued in use in Canada until the mid-1950s.

The CWM artefact came from Australia and has no direct connection to a Canadian unit. It is under restoration and is not in the Lebreton gallery. The photo is from the CWM web site.

CWM 20000230-001

British FV4201 *Chieftain* Tank

Used 1967 – 1980s

Technical Data (Foss. *The Illustrated Encyclopedia...*)

Crew:	four, (commander, driver, gunner, loader)
Weight:	55,000 kg (121,250 lbs)
Range:	450 km (280 miles)
Maximum Speed:	48 km/hr (30 mph)
Engine:	Leyland L60 12-cylinder 750-hp multi-fuel
Armament:	120-mm rifled gun, two 7.62-mm machine gun
Ammunition:	armour-piercing fin-stabilised discarding sabot (APFSDS), high explosive squash head (HESH), smoke, canister, and practice
Armour:	up to 388 mm



History

The *Chieftain* replaced the *Centurion* in British service in 1967 after about four years of teething troubles. At the time, it had the most powerful gun of any tank in the world. The 120-mm rifled gun was unusual for a tank in that the projectile and propellant were loaded separately. The fin-stabilised discarding sabot round had a special driving band that stopped the projectile from spinning. It had an excellent sighting system. The main weakness of the tank was its engine, which was relatively unreliable.

Iran, Kuwait, Oman and Jordan also used the *Chieftain*. The tank was adapted to a bridgelayer, armoured recovery vehicle, and other variants.

Canada never used the *Chieftain*. The CWM artefact was donated to the museum by the British Army Training Unit Suffield, which has been using the tank training area in Suffield, Alberta since 1972. The *Challenger* tank replaced the *Chieftain* in 1983.

CWM 19980108-001

British A22B Infantry Tank Mk IV *Churchill* III

Used 1941 – 1967. Used by Canada 1942-1943

Technical Data (Chamberlain, Peter and Ellis, Chris. *The Churchill Tank*. London. Arms and Armour Press, 1971.)

Crew: five, (commander, gunner, loader, driver, co-driver)
Weight: 39,000 kg (85,800 lbs)
Engine: Bedford 12-cylinder 350 hp in-line gasoline
Speed: 24.8 km/hr (15.5 mph)
Armament (*Churchill* III): 6-pounder gun, two 7.92-mm machine guns
Armour: up to 89 mm



History

The *Churchill* was designed as an infantry support tank in 1940. It was well armoured but extremely slow, although it had excellent hill-climbing abilities. At first, the vehicle was mechanically unreliable, and although the problems were fixed, it never overcame the bad reputation. The *Churchill* had many variants, including engineer vehicles, recovery vehicles, bridge-layers, and flamethrowers (and the *Great Eastern Ramp*). Some variants remained in British service until 1965.

Eighteen of the 28 tanks that were landed during the Dieppe raid in 1942 were *Churchill* III. None were knocked out by enemy fire, but the rocks on the beach broke their tracks and none returned. The Canadian Army used the *Churchill* until the *Sherman* replaced it in 1943.

The CWM artefact is prepared for a beach landing. The high “chimneys” at the back are the engine air intake and exhaust, which prevented the engine stalling if swamped by a wave.

CWM 20000230-005

British Mk IV “*Great Eastern Ramp*”

Used 1945

Technical Data (Chamberlain, Peter and Ellis, Chris. *The Churchill Tank*. London. Arms and Armour Press, 1971.)

Gross weight: 41.8 tonnes (46 tons)
 Weight (basic ramp): 4.54 tonnes (5 tons)
 Weight (rear ramp): 1.8 tonnes (2 tons)
 Length (basic and flying ramps): 7.6 m (25 ft) each
 Length (rear ramp): 3.96 m (13 ft)
 Total bridge length: 18.4 m (60 ft 5 in)



History

The *Great Eastern Ramp*, which was based on the *Churchill* tank chassis, was designed to cross or climb horizontal and vertical obstacles.

The tank carried a main ramp, which could be sloped upwards from the rear of the tank to a height of about 6 metres (20 feet) at the front. A second “flying” ramp was attached to the front of the main ramp by hinges. The flying ramp was stowed by folding it back on top of the main ramp. Hinged to the rear of the main ramp was a third short ramp that reached the ground. This was normally stowed sloping upwards at a 45-degree angle at the back of the tank.

To deploy the ramp, the tank was driven as close as possible to the obstacle. The rear ramp was lowered to the ground. Then groups of 3-inch rocket motors lifted the rear of the flying ramp, swinging it up and over to the front. Other vehicles could then drive up the ramps to cross the obstacle. The *Great Eastern* could also span an 18-metre (60-ft) gap.

The prototype was built on a *Churchill* Mark I hull. When initial trials were successful, another ten vehicles were built using Churchill Mark IV chassis with the heavier Mark VII suspension units fitted to take the 48-ton weight. Two vehicles were delivered to the 79th Armoured Division in North-west Europe early in 1945, but were never used in action.

The CWM *Great Eastern Ramp* has the main ramp in the stowed state and is missing the support brackets to angle the ramp up from the rear. The rear ramp has been detached from its hinges and laid flat on top of the flying ramp. The vehicle was one of two sent to Canada for trials in 1945. It was found in a Kempville, Ontario, scrap dealer’s lot and donated to the museum.

CWM 19720252-001

British Universal Carrier Mk I (Bren Gun Carrier)

Used by Canada: 1941 – 1961. Also produced in Canada

Technical Data (CMHQ Vehicle Data Book 1944)

Crew:	depended on the role
Gross weight:	4,454 kg (9,800 lb)
Maximum speed:	53 km/hour (33 mph)
Fuel consumption:	1.7 km/litre (4 mpg)
Engine:	Ford (221 cu in) 85 hp V8 gas
Armour:	up to 10 mm (0.28 - 0.39 in)



History

The Universal Carrier was a lightly armoured, fully tracked, general-purpose personnel and weapons carrier, which was developed from the Carden-Lloyd carriers of the 1930s. Initially, its mission was to carry infantry across fire-swept ground, hence its nickname of “Bren Gun Carrier”. In fact, only one variant carried the Bren light machine gun, but the name stuck to the whole family. The carrier was adapted to many different roles: carrying a medium machine gun or mortar, towing an anti-tank gun, as a reconnaissance or artillery forward observation vehicle, and others. It was usually overloaded, but tolerated this reasonably well.

The front compartment housed a driver and a gunner. There were two coffin-like spaces on either side of the engine in the rear for carrying men and their weapons. The driver used a steering wheel, which simplified training compared to tank drivers. The wheel initially bowed the track for gentle cornering, and then engaged the track brakes for more violent manoeuvring. Note the narrow space for the driver’s knuckles when on the wheel.

A total of 84,120 Universal Carriers were manufactured in Britain, Canada, Australia, New Zealand, and the US (as the T-16). Ford of Canada manufactured almost 29,000 of these, as well as 5,000 Windsor Carriers, which had an additional road wheel, was longer, and had a greater payload. Production stopped in 1945, but the Universal Carrier served in Canada until declared obsolete in January 1961.

CWM 19970113-001

Other Universal Carriers at the CWM

Tank Hunter

This version mounted the 2-pounder anti-tank gun. Canada designed and manufactured 100 of the vehicles, which were never used in combat. At the end of the war, the guns were removed and the carriers returned to their original configuration. The CWM artefact is currently under restoration and is not in the Lebreton Gallery.



Universal Carrier Mk II

The Mk II Universal Carrier was developed from the Mk I with few differences except for the stowage of equipment. There were six seats, as opposed to three in the Mark I version, but the crew depended on the role. The armament included rifles, Bren light machine gun, anti-tank rifle, plus support weapons carried as cargo (almost every infantry weapon used by British and Canadian infantry was carried at some time).

CWM 19720030-001



Universal Carrier No.2 Mk II with *Ronson* Flame-thrower

This version has the *Ronson* flame-thrower mounted on top of the front gunner's shield. Fuel was supplied from two 227-litre (60-gallon), pressurised tanks at the rear of the carrier. Although the system was not adopted by Britain, the *Ronson* was produced in limited numbers in Canada. The U.S. Marine Corps bought about 170, mounted them in modified M3A1 tanks, and used them in the Marianas campaign in the Pacific. The range of the flame-thrower was about 46 m (50 yd).

CWM 19720030-001



British Universal Carrier Mk II No. 2* with *Wasp IIC* Flame-thrower (in Gallery 3)

This version carries the *Wasp IIC* flame-thrower as developed for use by Canadian troops. It differs from the British Wasp equipment in that the 284-litre (75-gallon) flame fuel tank is mounted at the rear of the vehicle, allowing the carrier to be used for other purposes in addition to flame throwing. Canadians in Italy and in Northwest Europe used the Wasp IIC extensively. The flame-thrower had a range of approximately 90 m (100 yd).

CWM 19970113-003 Located in Gallery 3.



British Vickers Armstrong *Valentine* Mk VIIA Infantry Tank

Used by Canada 1942-1944. Also produced in Canada

Technical Data (Foss. *The Illustrated Encyclopedia...*)

Crew:	three (commander, gunner, driver)
Weight:	16,257 kg (35,840 lbs)
Speed:	24 km/hr (15 mph)
Engine:	GM 138 hp diesel
Armament:	2-pounder gun, one 7.92-mm machine gun
Armour:	up to 65 mm



History

The *Valentine* was designed in 1938 as an infantry support tank. For the time, it was reasonably well armoured, but its low speed was a disadvantage. It was simple, extremely reliable, and easy to maintain. The 2-pounder gun was good in 1939, but was later replaced with the 6-pounder, or a 76.2-mm gun in the Soviet Union. The Valentine chassis was used in the *Bishop* self-propelled 25-pounder gun and also in the extremely successful *Archer* self-propelled 17-pounder anti-tank gun. Britain manufactured 6,855 Valentines, and Canada produced 1,420 at the CPR Angus works (1,390 were sent to the Soviet Union under Lend-Lease arrangements).

Artefact history from the CWM web site: The CWM tank is No. 838, built in May 1943. It was shipped to Russia where it was allocated to the 57th Regiment of the 5th Guards Tank Army. That regiment lost a large number of tanks, including Canadian built Valentines, during the battle of Kursk in the summer of 1943. Valentine No. 838 was lost during a Soviet counter-offensive on January 25th, 1944 in Ukraine. The battle was one of a series of counter-attacks by the Red Army against the German Wehrmacht that winter. Two Valentine tanks were among those in an initial assault over the ice at a former bridge crossing across the swampy river. The first tank was successful in crossing the ice, but the second, No. 838, went through the ice and was lost. Its three-man crew escaped. The tank rested in the bog near the village of Telepino, about 180 kilometres south of Kyiv, until the summer of 1990. A 74-year old villager remembered it going down. To mark the new era of "glasnost", the tank was retrieved intact with the help of six tractors and two power winches. It was offered to Canada, and the Canadian War Museum accepted it on behalf of Canada. This tank is one of two surviving Canadian-built Valentines in the world. Its nameplate reads: *Valentine VII-A, Vickers-Armstrong Design, built by Canadian-Pacific Railway*.

CWM 19920195-001

Canadian Armoured Vehicle General Purpose (AVGP) Family

Used by Canada - 1976 – Present

Militia units are not usually located on a training area and must travel to a nearby Canadian Army base for tactical training. Tracked vehicles must be carried on low-bed trailers or duplicated at both the militia armouries and the base. Tracked vehicles are also harder to maintain and more costly to operate than wheeled vehicles. Accordingly, in the 1970s, the Canadian Forces designed and built a series of training vehicles for the reserves.

Using the Swiss Mowag *Piranha* 6x6 vehicle as the basis, a new family of wheeled armoured vehicles were produced at General Motors of Canada's Diesel Division in London, Ontario and entered service in 1976. A total of 269 *Grizzly* armoured personnel carriers, 195 *Cougar* tank trainers, and 27 *Husky* repair and recovery vehicles were built. The vehicles have the same basic hull arrangement and running gear. A 275 hp Detroit Diesel 6V53T 6-cylinder two-cycle turbo-charged diesel engine is mounted in the right hull front. The driver, sitting to the left of the engine, can select either rear-wheel drive or six-wheel drive. The crew commander sits directly behind the driver. All AVGPs are fully amphibious and are powered in the water by twin propellers mounted on the rear corners of the hull.

Despite being designed as training vehicles, the AVGP family have been used on peacekeeping (!) missions in Somalia, Bosnia, and Kosovo under UN and NATO auspices. The vehicles had severe shortcomings when used in these operations. Designed as a trainer, the AVGP 10-mm armour provides minimal protection against shell splinters and normal rifle bullets. However, they are vulnerable to armour-piercing ammunition, heavy machine guns, and rocket-propelled grenades. To this end, the *Grizzlies* and *Cougars* that were used in Bosnia and Kosovo were fitted with additional armour. Developed by Foster-Miller Inc, the Light Appliqué System Technique (LAST) consists of Velcro strips covering the vehicle, hexagonal palm-size ceramic armour modules with Velcro on both sides, and a rubberized Kevlar protective cover with a Velcro underside. The package is fitted to the hull and turret to provide additional crew protection, although mechanics have told the author that there are problems with keeping the ceramic hexagons attached in muddy conditions. Damaged ceramic panels can be removed and replaced on an individual basis. The CWM *Cougar* and *Grizzly* artefacts served in Bosnia and retain the base Velcro attachments and part of the protective cover.

The AVGP project led to an order of eight-wheeled vehicles for the American Marine Corps, and later to the *Bison* family of vehicles now in Canadian service.

Technical Data (DND.)

Weight:	10,700 kg (23,540 lb)
Maximum speed:	100 km/h (60 mph)
Range:	600 km (375 miles)
Armament (<i>Cougar</i>):	76-mm L23A1 gun, 7.62 mm C6 machine gun, and 66-mm smoke grenade launchers
Armament (<i>Grizzly</i>):	0.50-inch or a 7.62-mm C6 machine-gun, and 66-mm smoke grenade launchers

Canadian AVGP *Cougar* Fire Support Vehicle

The *Cougar* uses the turret from the British CRV(T) *Scorpion* reconnaissance vehicle. It mounts a Royal Ordnance 76-mm L23A1 gun with a coaxial 7.62-mm C6 machine gun. The 76-mm gun lacks the punch of a high-velocity tank gun, but its squash-head (or HESH) round gives the *Cougar* some anti-armour capability. It can also fire high explosive and smoke shells. There is room for two infantrymen behind the turret. Although never intended to be combat vehicles, AVGPs were sent overseas on peacekeeping duties. There, the tracked M113A1 APCs were unsuited to road patrols and were replaced by *Grizzly* APCs. The *Cougar* made an ideal fire support vehicle to back up the lightly-armed *Grizzlies*. The scars on the vehicle are a result of mortar shells exploding close to the *Cougar* in Bosnia.

CWM 20030358-005



Canadian AVGP *Grizzly* Armoured Personnel Carrier

The *Grizzly* APC is the basic member of the AVGP family, and is fitted with a Cadillac-Gage turret. It has a three-man crew (driver, crew commander, and gunner), with additional seating for four to eight infantry in the rear compartment (four fully-equipped, or six lightly-equipped infantrymen, or eight with two men jammed in beside the turret). The artefact was delivered to the Canadian Army on 14 April 1979.

CWM 20030358-005



Canadian AVGP *Husky* Repair and Recovery Vehicle

The *Husky* is the AVGP repair and recovery variant and mounts a HIAB knuckle-boom hydraulic crane on the roof. The HIAB crane can lift 3.25 tons. Side-mounted hydraulic jacks stabilize the vehicle while the crane is in operation. The *Husky* is also fitted with a rear-mounted winch (with an 8-ton pull capacity) to recover disabled vehicles. A pintle-mounted machine gun can be fitted for self-defence. The CWM does not have a *Husky*. The photo is from the DND website.



Canadian GM C15AA Armoured Ambulance

Used by Canada 1943 – 1950s

Technical Data

Crew:	two plus four stretchers
Gross weight:	5,352 kg (11,775 lb) (truck version)
Engine:	GMC Model 270 6-cylinder 104-hp 269.5-cubic inch
Armour:	14 mm (front), 6 mm (side)



History

General Motors developed a 15-cwt armoured truck in 1943 as an armoured troop carrier. 3,961 were produced, more than any other Canadian wheeled armoured vehicle. The British and Canadian soldiers preferred it to the American half-tracks and scout cars. The truck was very manoeuvrable and could stop and start while going up a 60-degree slope. There were several variants including a 2-strecher ambulance and a command vehicle. The CWM artefact is a 4-stretcher armoured ambulance that was designed in 1945, but few were produced before the end of the war. This sole surviving example served with the British Royal Army Medical Corps in Britain and in West Berlin.

CWM 19870221-001

Canadian Ford Lynx Scout Car

Used by Canada 1941 – 1945

Technical Data (CMHQ Vehicle Data Book 1944)

Gross weight:	4,259 kg (9,370 lb)
Maximum speed:	80 km/hour (50 mph)
Engine:	Ford 95 bhp 8-cylinder V8
Armour:	12 - 30 mm (0.4 – 1.18 in)
Armament:	0.303-inch Bren LMG



History

A scout car is used for liaison and reconnaissance duties, relying on its low silhouette and speed to avoid enemy action. The *Lynx* was the first rear-engined wheeled armoured vehicle designed in Canada. It was based on the British Daimler *Dingo*, but adapted for Canadian production methods. However, the stresses on the vehicle were not understood and it had many early production problems. These were worked out by 1944 and the *Lynx* was popular with its Canadian crews. About 3,255 cars were manufactured, in two major variants, in Windsor, Ontario. The steering wheel and driver's seat are angled to assist in driving in reverse. The vehicle has five forward and five reverse gears. An experimental model was fitted with a 2-pounder anti-tank gun.

CWM 19810943-002

Canadian *Fox* Armoured Car

Used by Canada 1941 – 1945

Technical Data (Marteinson and McNorgan.)

Crew:	four
Gross weight:	7,800 kg (17,159 lb)
Maximum speed:	70 km/hour (44 mph)
Engine:	GMC 270 cu-in 6-cylinder in line
Armour:	up to 15 mm (0.59 in)
Armament:	0.50-inch and 0.303-inch MG



History

The Army Engineering Design Branch and General Motors developed the *Fox* armoured car, which was based on the British *Humber* armoured car, but with changes to suit Canadian manufacturing. Although heavier than the *Humber*, the *Fox* had a larger engine and performed well. The *Fox* was generally considered too high and too lightly armed for combat, although it did see some service in Italy and in Northwest Europe with Canadian reconnaissance regiments. It was used in training in England, before being replaced by the American *Staghound* armoured car before the invasion of Normandy.

CWM 19820372-001

Canadian *Otter* Light Armoured Car

Used by Canada 1941 – 1945

Technical Data (CMHQ Vehicle Data Book 1944)

Crew:	three
Gross weight:	5,000 kg (11,000 lb)
Engine:	GM 106 bhp 6-cylinder in-line
Armour:	8 - 12 mm (0.3 – 0.47 in)
Armament:	0.303-inch Bren LMG



History

Following the evacuation at Dunkirk in 1940, armoured cars were in short supply in the British Commonwealth, and General A.G.L. MacNaughton urged the development of a Canadian vehicle. Based on a few photographs, the Hamilton Bridge Company designed a vehicle based on the Chevrolet 4x4 chassis. It was Canada's first attempt to build a wheeled armoured vehicle and the results were not outstanding. The main fault was that the car was underpowered, but it served reliably in reconnaissance, convoy escort, and airfield defence roles. A total of 1,761 *Otters* were produced.

CWM 19820372-002

Canadian “Tracked Jeep”

Tracked Jeep Mk I – The *Bantam* Armoured Tracked Vehicle

Used (development only) 1943 - 1945

Technical Data (Canadian Military Vehicle Profiles)

Crew:	two
Gross weight:	2,045 kg (4,500 lb)
Maximum speed:	56 km/hour (35 mph) – 8 km/hr (5 mph) in water
Engine:	Willies MB
Armour:	up to 12 mm (0.5 in)
Armament:	Bren light machine guns



History

In the fall of 1942, officers at the Canadian Army Proving Establishment near Ottawa designed a small two-man armoured vehicle that they called the “tracked jeep”. Victoria Foundry produced a crude hull and a prototype was fitted with the Willys MD jeep engine. In tests at Aberdeen Proving Grounds in the U.S., it was superior to the Willys wheeled jeep and also the T-16 Universal Carrier. Since the prototype was promising, five pilot models were developed and produced by the Marmon Herrington Corporation and Willies Overland Corporation in late 1943. However, British interest was low, America had other production priorities, and by the time it was ready for trials in Europe, the war was almost over, so it never entered service. The vehicle was amphibious in smooth water without floatation devices.

The CWM artefact was painted in German colours and starred in the movie “*The Dirty Dozen*” starring Lee Marvin.

CWM 19940006-001

Prototype Tracked Jeep Mk II

Used by Canada 1945 - 1946

History

Six pilot models of an unarmed, non-armoured cargo carrier were ordered in 1944, but were not delivered until 1946. They were built by Willys Overland of Toledo, Ohio, and the hull was built by Marmon-Herrington. The vehicle was amphibious, and air-portable in a DC-3 Dakota aircraft. It could carry up to 454 kg (1,000 lb) of cargo over wet terrain while towing a 454 kg (1,000 lb) trailer. The vehicles were tested in Churchill, Manitoba, in 1946, but then development stopped.

CWM 19990220-002



Canadian *Ram* Mk II Tank

Used by Canada 1941 – 1945

Technical Data (Roberts. *The Ram...*)

Crew: five (commander, gunner, loader/radio operator, driver, co-driver)

Gross weight (Ram II): 29,545 kg (65,000 lb)

Maximum speed: 40 km/hour (25 mph)

Maximum fording: 0.9 m (36 in)

Fuel consumption: 0.9 mpg

Armour: up to 89 mm (3.5 in)

Engine: Wright R975/EC2 9-cylinder 400 hp radial engine (later changed to the Continental version of the engine)

Armament: 2-pounder (Ram I) or 6-pounder (Ram II), two .30-calibre MG

History

Montreal Locomotive Works designed and built the *Ram* tank in 1941. It was heavily based on the American M3, and for the time, it was an advanced design. It used a cast hull and turret and was intended to mount either the 2-pounder (*Ram* Mark 1) or 6-pounder gun (*Ram* Mark 2). A total of 2,122 Rams were manufactured.

Because its turret ring was too small to fit a 75-mm gun, the *Ram* was never used as a tank in combat. It was used widely in training, and many were converted to armoured personnel carriers (*Kangaroos*), armoured gun tractors for the 17-pounder anti-tank gun, command and observation tanks, ammunition carriers, armoured recovery vehicles and flamethrowers.

CWM 19720260-001



Canadian *Grizzly* Tank

Used by Canada 1943 – 1950

Technical Data (for M4A1) (Forty. *M4 Sherman*.)

Crew:	five (commander, gunner, loader/radio operator, driver, co-driver)
Gross weight:	30,364 kg (66,800 lb)
Maximum speed:	38 km/hour (24 mph)
Range:	192 km (120 miles)
Maximum fording:	0.91 m (36 in)
Engine:	Continental R957C1 9-cylinder 350-hp radial gasoline
Armour:	up to 75 mm (3 in)
Armament:	75-mm (3 in) gun, two 7.62 mm (0.30 in) machine guns



History

Montreal Locomotive Works manufactured the American M4A1 *Sherman* tank under licence and named it the *Grizzly*. The main difference was that the *Grizzly* used Canadian Dry Pin tracks and a sprocket with 13 teeth instead of the *Sherman*'s 17 teeth. There was also a 2-inch bomb thrower and the vehicle used British-style stowage.

MLW produced 188 *Grizzlies* between September and December 1943. Some were shipped to Europe, but most were used in training in Canada. Production stopped when it was realised that American production lines could produce far more tanks than Canada, and that our efforts were better directed to the *Sexton* self-propelled gun.

The *Grizzly* chassis was used as a basis for the Canadian-developed *Skink* anti-aircraft tank. The *Grizzly* continued in service in Canada after the Second World War. The CWM artefact starred in the television series “*Band of Brothers*”.

CWM 20000230-002

Canadian 25-pounder Sexton Self-propelled Gun

Used by Canada 1943 - 1957

Technical Data (Knight. *The Sexton...*)

Crew:	6 including driver
Gross weight:	25,909 kg (57,000 lb) loaded
Maximum speed:	40 km/hr (25 mph)
Traverse	25° left, 15° right
Elevation	-9° to +40°
Armour:	up to 31.75 mm (1.25 inches)
Engine:	Continental Motors R975-C4 Static Radial, 973 cubic-inch, 9-cylinder, air-cooled, 4-cycle, 484-hp gasoline engine
Armament:	25-pounder field gun, two Bren .303 light machine guns
Range (gun)	12,250 m (13,400 yards)



History

Montreal Locomotive Works designed the Sexton in 1942 by mounting a standard 25-pounder field gun on a modified Ram tank chassis. After trials in England, the British Army stated that it was clearly the best SP gun that was available at the time.

It became the standard SP field gun in the British Commonwealth, and served in several NATO nations after the war. A total of 2,150 were manufactured. A command post variant for the Gun Position Officer was also produced. Canada used the Sexton from 1942 until the late 1950s when the artillery converted to the 105-mm howitzer.

The CWM artefact was the 613th gun manufactured in Canada. Mr A. F. Budge restored it in England before it was purchased by the CWM and returned to Canada in the 1990s.

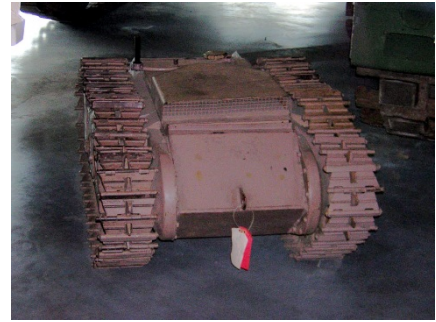
CWM 19930021-001

German *Goliath* Demolition Vehicle

Used 1980 – 1998

Technical Data (TM-E 30-451 Handbook on German Military Forces, March 1945)

Total weight:	364 kg (800 lb) (approximately)
Speed:	8 – 19 km/hr (5 - 12 mph)
Engine:	2-cylinder, 2-cycle in-line gasoline engine with chain drive, or two 12-volt Bosch starter motors geared to driving sprockets



Weight of explosive charge: 91 kg (200 lb) (approximately)

History

Goliath was a remotely controlled demolition vehicle. It was transported to the front line on a two-wheeled trailer. After being unloaded from the trailer, it was controlled to its target through the three-core cable, about 600 metres (2,000 ft) long, which unwound from the rear and was connected to the operator's control panel. The firing circuit ran through the two outer wires in the three-core cable. Throwing a switch on the control panel set off the explosives. The Goliath was expendable and was destroyed when its demolition charge was set off.

Goliath's hull is divided into three compartments. The explosive charge is carried in the front compartment; the engine (in the gasoline driven version) and control gear are in the centre, and the drum carrying the coiled cable is in the rear compartment. Hinged steel covers give access to the cable compartment and the engine space. The vehicle is driven by front sprockets. There are four bogie wheels, mounted on lever arms with simple coil springing, and a rear idler. A small jockey wheel is mounted between the driving sprocket and the first bogie wheel on each side.

There were two major variants: one with a gasoline engine and one with an electric motor. In the electrically driven type, the motors that drove each track were controlled individually. In the gasoline-driven model, the operator controlled the magnetic clutches that controlled the tracks. There was no provision for reversing the vehicle. The CWM artefact has a gasoline engine.

CWM

German *Leopard C1* Tank

Used by Canada 1976 - 2005

Technical Data (Marteinson and McNorgan.)

Crew:	four, (commander, driver, gunner, loader /radio operator)
Weight:	42,500 kg (93,500 lb)
Speed:	65 km/hr (40.6 mph)
Range:	600 km (375 miles)
Engine:	Motoren und Turbinen Union 10 cylinders, 830 hp multi-fuel
Armour:	up to 70 mm (2.75 in)
Armament:	105-mm L7A3 gun, 2 x 7.62-mm machine guns, 76-mm grenade launchers (2 clusters of 4 launchers)



History

The *Leopard C1* tank replaced the British *Centurion* tank in the Royal Canadian Armoured Corps in 1978. The C1 was built to Canadian specifications and was roughly equivalent to the *Leopard 1A4* used by the German army. The tank used a welded turret with spaced armour and the then-NATO-standard 105-mm gun. Although the armour was considered thin compared to American and Soviet tanks, the *Leopard C1* had excellent mobility, and an outstanding Belgian SABCA fire control system that included a laser range finder and a low-light television night vision system. The tank may be sealed against nuclear-biological-chemical threats. The engine and transmission can be replaced in 30 minutes under field conditions.

As it entered service, the Soviet Union fielded the T-72 tank, which out-gunned *Leopard*, could match its mobility, and which the Leopard's 105-mm gun could not penetrate frontally. The operational viability of the C1s was already in question by 1981, but funding prevented any upgrades for more than a decade. There were 114 *Leopards* in Canadian service, including an Armoured Repair and Recovery Vehicle, Armoured Engineer Vehicle, and Bridge Layer variants.

German *Leopard C2* Tank

In 1998, the *Leopard C1*s were upgraded to the Leopard C2. Essentially the old C1 turret was replaced with a 1A5 turret with a fully stabilized fire control system including an integrated thermal imaging system, laser range finder, and muzzle reference system. It can engage targets by day or night, while on the move, and under adverse weather conditions. Additional armour – the MEXAS “Modular Expandable Armour System” - can also be seen on the turret.



CWM 20030058-006 (C1) and CWM 20030358-015 (C2)

German Jagdpanzer IV /70 (SdKfz 162/1) Assault Gun

Used 1944 – 1945

Technical Data (Von Senger und Etterlin. *German Tanks...*)

Crew: four, (commander, driver, gunner, loader)
Weight: 25,800 kg (56,760 lbs)
Speed: 40 km/hr (25 mph)
Range: 200 km (125 miles)
Armour: up to 80 mm depending on the version
Engine: Maybach HL 120 TRM 12-cylinder water-cooled 300 hp gasoline
Armament: 75-mm Skuk 42 L/70 gun, one 7.92-mm machine gun



History

The Jagdpanzer IV was an improved and modified version of the Stug III assault gun. Design began in December 1942, with specifications calling for 100-mm frontal armour, the 75mm Pak 42 L/70 gun, with the vehicle to be based on the PzKpfw IV chassis. Problems forced several variants to be developed. The heavy long-barrelled gun and thick frontal armour made the nose extremely heavy and caused mobility problems. This was partially fixed by fitting steel-rimmed wheels at the first two road wheels in IV/70(V) and on the first four road wheels in IV/70(A) instead of rubber ones that could not handle the weight. Another problem was the length of the gun, which vibrated and even got stuck in the ground while moving through rough terrain. This was fixed by installing a travel lock.

The Jagdpanzer IV with its low profile, good mobility and firepower was popular with its crews. For the Allies, it was a difficult target and a dangerous opponent. Its main gun, a variant of the gun on the Panther tank, was able to destroy all Allied tanks except the Soviet JS-122 (JS-2) heavy tank at long ranges. Its main problem was that the lack of a turret forced the vehicle to face its target, requiring close cooperation between driver and gunner. The Jagdpanzer IV was a great defensive weapon, but was produced too late and in too small quantity (about 1,530 vehicles) to have a great impact on the war.

CWM 19700171-001

German PanzerKampfwagon (PzKpfw) II (Panzer II) Light Tank

Used 1936 – 1943

Technical Data (Foss. *The Illustrated Encyclopedia...*)

Crew:	three, (commander, driver, gunner)
Weight:	9,500 kg (20,944 lbs)
Speed:	40 km/hr (25 mph)
Armament:	20-mm gun, one 7.92-mm MG
Engine:	Mayback HL 62 TR 6-cylinder water-cooled in-line 130 hp gasoline
Armour:	up to 30 to 35 mm depending on the tank version



History

Germany developed the Panzer II in 1935 as an interim tank when it became apparent that the larger Panzer III tanks would not be available until 1938. The Panzer II was the tank that the Germans used to develop their theories on the use of armoured forces. Prototypes were sent to Spain to gain experience in action during the Spanish civil war. More than 1,000 Panzer II tanks were available for the invasion of Poland in 1939. By the time of the campaign in France in 1940, it was obviously under-gunned and under-armoured, but remained an ideal reconnaissance tank.

The 20-mm gun had a maximum range of 600 m (650 yd) and fired only armour-piercing ammunition that had indifferent performance. The tank was not well armoured, although the armour thickness was increased in later models. Still, despite its shortcomings, it was the backbone of the German panzer divisions in the first part of the Second World War, and approximately 860 were still in use in 1942.

There were six main versions, generally increasing armour thickness and improving the gun. The Panzer II was also converted into self-propelled guns, command tanks, and flamethrowers.

CWM 19590012-003

German PanzerKampfwagon (PzKpfw) V Ausf. A, SdKfz 171 *Panther* Tank

Used 1943 – 1945

Technical Data (Von Senger und Etterlin. *German Tanks...*)

Crew:	five (commander, gunner, loader, driver, co-driver)
Weight:	45,500 kg (100,100 lbs)
Maximum speed:	46 km/hr (29 mph)
Range:	177 km (110 miles)
Engine:	Maybach HL 230 P30 V-12 water-cooled 700 hp gasoline
Armament:	75-mm KwK 42 /70 gun, two 7.92-mm machine guns
Armour:	up to 120 mm



History

Germany developed the Panzer V in 1942 to cope with the T-34 tank, which had been a very unpleasant surprise for the Germans when they invaded The Soviet Union. Some German officers suggested that the T-34 be copied directly, but this was not acceptable for prestige reasons. The rushed development caused many problems, especially with the engine (which was over-stressed and tended to catch fire) and with the complicated suspension system. Forced into action at Hitler's insistence at the battle of Kursk, the tank was a complete failure. Most of the *Panthers* broke down on the way to the battle.

Later models corrected the faults, and it soon became very popular with its crews. More than 5,000 *Panthers* were eventually manufactured. With its sloped armour and the excellent 75-mm long-barrelled gun, it was superior to the T-34 and, arguably, a better tank than the Panzer VI *Tiger*. From the front (the thickest armour), the Panther could knock out the Allies' *Sherman* tank at more than 2,000 metres. The standard *Sherman* tank could not penetrate the *Panther's* frontal armour at any range.

The CWM artefact was probably brought to Canada after the war by the author, Farley Mowat, and spent more than 50 years at the Canadian Forces Base Borden museum. It is currently under restoration and is not on display. The photo is from the CWM web site.

CWM 20030358-017

Italian CV-33 II Tankette (L3/33)

Used 1933 - 1943

Technical Data (Foss. *The Illustrated Encyclopedia ...*)

Crew:	two
Gross weight:	3,435 kg (7560 lb)
Maximum speed:	42 km/hour (26 mph)
Maximum fording:	0.7 m (28 in)
Range:	125 km (78 miles)
Engine:	Fiat SPA CV3 43 hp 4-cylinder gasoline
Armour:	up to 15 mm (0.6 in)
Armament:	Two Fiat 8-mm machine guns



History

Italy designed the Carro Veloce (Fast Tank) CV33 tankette in the early 1930s based on the British-built Carden-Loyd Mark VI tankette. At first equipped with a single 6.5-mm machine gun, the Series II entered production in 1935 with dual 8-mm machine guns. The CV33 hull was also used as a basis for a flamethrower, armoured recovery vehicle, bridge layer, and a few mounted a 37-mm gun.

It was reasonably successfully in Ethiopia against an army with no antitank weapons, but even there it had obvious flaws. It saw action in the Spanish civil war, but with its thin armour and weak armament, it was already obsolete. Despite this, it was used in North Africa, France, Greece, Yugoslavia, Albania, Crete, North Africa, Russia, Corsica, Sardinia, Sicily, and Italy during the Second World War.

CWM 19590012-002

Soviet T-34/85 Medium Tank

Used 1940 – 1965

Technical Data (Foss. *The Illustrated Encyclopedia ...*)

Crew:	five, (commander, gunner, loader, driver, co-driver)
Weight:	32,000 kg (70,547 lbs)
Engine:	V-2-34 500 hp 12-cylinder water-cooled diesel
Speed:	50 km/hr (31 mph)
Ground pressure:	0.8 kg/cm ² (11.2 lb/in ²)
Range:	300 km (186 miles)
Armament:	85-mm ZIS S53 L/51 gun, two 7.62-mm DT machine guns
Armour:	up to 60 mm



History

The T-34 entered mass production in June 1940 and was a major surprise to the Germans when they encountered it in the summer of 1941. Its sloped armour gave excellent protection for less weight. The diesel engine was reliable, reduced the fire risk and increased the operational range. Its long-barrelled 76-mm high-velocity gun was an innovation for a medium tank. The modified Christie suspension allowed high speed and the wide tracks gave a low ground pressure, which was a definite advantage in the Russian terrain.

The T-34/85 was approved for production in December 1943, major changes being the 85-mm gun and a cast turret. More than 11,000 were produced in 1944 alone. After the war, about 80,000 were produced in Poland and Czechoslovakia. The T-34/85 was in production until 1948, and remained in service in several countries until the mid-1960s. It was used by the North Koreans during the Korean War.

Note the simplicity of the vehicle. No attention has been paid to cosmetics, but parts that must function together are well made. Particularly notice the mechanism for keeping the track link pin from working its way out during movement. The crew area is small compared to Western tanks. In particular, the driver should be less than 5'4" high and stocky because operating the brake and clutch took a lot of effort. Having said this, many Soviet tank drivers were women. The Germans considered the tanks to be noisy – it could be heard at a distance of about 400 m.

The CWM artefact was built in 1944 at the tank factory in Nizhny Tagil. It fought in the Ukraine during the war. In 1988, the Soviet government presented the tank to the CWM in recognition of the aid that Canada supplied to the USSR during the Second World War. The tank is in running condition, and most of its internal equipment is complete.

CWM 19880285-001

Soviet BRM-1K (BMP M1976/2) Armoured Reconnaissance Command Vehicle

Used 1967 – Present

Technical Data (Federation of American Scientists)

Crew:	three (commander, gunner, driver) plus three soldiers
Weight:	12,500 kg (27,500 lbs)
Speed:	70 km/hr (31 mph)
Range:	500 km (310 miles)
Trench crossing:	2.2 m (7 ft 3 in)
Engine:	280 hp water-cooled diesel
Armament:	73-mm smoothbore gun, one 7.62-mm machine gun
Armour:	up to 14 mm



History

The BMP entered service in the Soviet Union in 1967, and was the world's first vehicle that was designed to let infantry fight from the vehicle (as opposed to the M113 family that just transport the infantry to battle). The crew sit in the centre of the vehicle, facing outwards, and can fire their weapons through ports in the hull. The vehicle is completely amphibious. The BMP has been widely exported and has many variants.

The BRM-1K (BMP M1976/2) Armoured Reconnaissance Command Vehicle, derived from BMP-1, has a 2-man turret and additional sensors. It has additional communications, a land navigation set, a laser-rangefinder sight, and a PSNR-5K *Tall Mike* (NATO designation) battlefield surveillance radar. The radar is mounted in the rear part of the turret, and is elevated above the turret roof when needed, and lowered into the turret when not used. The vehicle mounts the BMP's 73-mm smoothbore main gun (without the SAGGER anti-tank missile launcher that is standard on the fighting vehicle). Two man-portable surface-to-air missile launchers are normally carried. Passengers may dismount from BRM-1K and set up a fixed observation post.

The CWM artefact was manufactured in 1986 and came from Germany after the unification of the country in the 1990s.

CWM 19930093-001

Section 3 - Wheeled Vehicles

Sources

Clayton, Michael. *Jeep*. North Pomfret, Vermont, David and Charles Ltd, 1982.

Gregg, William. *Canada's Fighting Vehicles, Europe 1943-45*. Canadian Military Vehicle Series, Volume I. Rockwood, Canadian Military Historical Society, 1980.

Gregg, William. *Blueprint for Victory, The story of military vehicle design and production in Canada from 1937-45*. Canadian Military Vehicle Series, Volume III. Rockwood, Canadian Military Historical Society, 1981.

Motorcycles

The CWM has a number of motorcycles, including:

- 1995 Kawasaki
- Armstrong
- Triumph TRW
- Harley Davidson Model WLC "Indian"
- Norton
- Something with a sidecar



British Triumph TRW Mk 1 Motorcycle

Used by Canada 1957 – late 1960s

Technical Data

Empty weight:	384 kg (384 lb)
Maximum speed (road):	112 km/hour (70 mph)
Range:	400 km (250 mi)
Engine:	Triumph vertical, parallel, twin-cylinder, air-cooled, 499 cc (30.5 cu in) gasoline-fuelled

After the Second World War, the Triumph Motor Company designed the TRW motorcycle using as many commercial parts as possible in order to reduce costs. The biggest innovation from wartime military bikes was the use of a totally enclosed rear chain. Because they had many motorcycles from the war, the British Army procured only 12 machines, but many were sold to other countries. The Canadian Army used this motorcycle for liaison and communication duties from 1957 until the late 1960s.

CWM 19700163-001

American Dodge WC-15 Command Car

Used 1940 - 1945

Technical Data

Maximum speed: 96 km/hour (60 mph)
Engine: 6-cylinder 58 kw (78 hp) Dodge
T-211 gasoline powered
Payload: Driver and up to five passengers



History

Late in 1940, Dodge began to produce trucks to a military pattern that were based on their civilian models, but with redesigned running gear and constructed using heavier gauge sheet metal. The various models included a command car, ambulance, weapons carrier, and pickup and panel trucks.

The CWM artefact is the 4x4 WC-15 Reconnaissance model (Command Car). It has bench-type leather rear seats, which are accessible through a cutaway door opening. It was widely used by the American army, but the vehicle's distinctive shape tended to attract the unwelcome attention of snipers and enemy aircraft, and many officers preferred to use the more anonymous jeep.

CWM 19970113-010

American Dodge WC-18 Ambulance

Used 1940 - 1945

Technical Data

Maximum speed: 96 km/hour (60 mph)
Engine: 6-cylinder 58 kw (78 hp) Dodge
T-211 gasoline powered
Payload: Two crew plus four stretchers, or
seven sitting patients



History

Late in 1940, Dodge began to produce trucks to a military pattern. These were based on their civilian models, but had redesigned running gear and were constructed using heavier gauge sheet metal. The letters WC and a numerical suffix (for example, WC-18) designated the particular combination of engine, winch and body style. The various models included a command car, ambulance, weapons carrier, pickup, and panel trucks.

The CWM artefact is the 4x4 WC-18 ambulance (without winch). Some of these vehicles were delivered to the British under the Lend-Lease program, and were in action before the United States entered the Second World War. It was widely used by the American army for many years.

CWM 19970113-009

American Dodge M37 CAN ¾-ton Truck

Designed in United States - also produced in Canada

Used by Canada 1958 – 1980

The American-designed Dodge M37 ¾-ton truck was produced from 1958 to 1964, and was adopted by many countries. This version, the M37 CAN was manufactured by Chrysler, Canada, and included a hard top on the cab, and an improved heater for winter use. The Canadian Army used the truck until 1980, and many M37 remain in commercial use to this day.



In addition to the basic cargo version, some vehicles were adapted to carry the SS-11B anti-tank missile. In many units, the canvas cargo cover was unofficially reinforced with plywood, and the vehicle used as a radio-equipped command post. Other vehicles were equipped as telephone cable-layers, and light repair vehicles.

Technical Data (for M37 [M152 in brackets if different]. DND data)

Cab seating: Driver, plus two passengers

Gross weight: 3,432 kg (7,550 lb) [4,304 kg (9,470 lb)]

Maximum speed (road): 88.5 km/hour (55 mph)

Maximum fording depth: 1.06m (42 in) without preparation

Range: 360 km (225 mi)

Engine: Dodge 6-cylinder 103 hp flat-head gasoline

Payload (road): 907 kg (1,995 lb) plus a 2,722 kg (5,988 lb) towed load

CWM 19810774-001

American Dodge M152 CDN ¾-ton Utility Vehicle

Designed in United States - also produced in Canada

Used by Canada 1958 – 1980

The M152 CDN ¾-ton Truck, Panel, Utility was a variation of the 4x4 Dodge M37 CAN cargo truck. Produced by Chrysler, Canada in the 1950's, it was used by the Canadian Army until 1980 and some are in use by commercial operators. The cargo body of the M37 CAN was replaced with a rigid box body that was then equipped for many specialised roles, such as radio or cipher trucks, command posts, ambulances, and light workshops.



Technical Data (see above)

CWM 19810643-001

American Diamond T Model 969 Medium Breakdown Tractor

Used by Canada 1941 – 1950s

Technical Data (Gregg. *Canada's Fighting Vehicles...*)

Wheelbase:	3.83 m (151 in)
Maximum weight:	11,964 kg (26,320 lb)
Maximum speed:	64 km/hour (40 mph)
Fuel consumption:	1.3 km/litre (3 mpg)
Engine:	Hercules 6-cylinder 530 cu in, 131 hp side-valve gasoline



History

The Model 969 Recovery Vehicle (Wrecker) was a version of the American Diamond T 4-ton 6x6 Model 967 cargo truck, which was in production from 1941 until the end of the Second World War. The vehicle was equipped with a Holmes 45 twin-boom recovery kit. Each boom had a capacity of 4,545 kg (10,000 lb); more using blocks and pulleys. The booms could be used together to provide a combined pull at the rear of the vehicle, or one boom could be used to stabilise the truck while the other was used for recovery. In Northwest Europe during the Second World War, the Royal Canadian Electrical and Mechanical Engineers and the Royal Canadian Army Service Corps used the Diamond T for recovery and towing vehicle casualties to a workshop for repair.

CWM 19970113-013

American Diamond T 4-ton 6-wheeled Type “M” Machinery Lorry

Used by Canada 1941 – 1950s

Technical Data (Gregg. *Canada's Fighting Vehicles...*)

Wheelbase:	5.1 m (201 in)
Maximum weight:	12,273 kg (27,000 lb)
Maximum speed:	64 km/hour (40 mph)
Engine:	Hercules 6-cylinder 8.7 litre 131 hp side-valve gasoline



History

The Type “M” Machinery Lorry was a version of the American Diamond T 4-ton 6x6 Model 967 cargo truck. The Royal Canadian Electrical and Mechanical Engineers and the Royal Canadian Army Service Corps workshops used the vehicle to repair automotive components and parts. On-board equipment normally included a bench lathe, paint sprayer, valve grinder and refacer, pinhole grinder, bench grinder, brake re-liner, and battery charger. In 1994, the CWM artefact was restored by 202 Base Workshop in Montreal as an automotive machine shop.

CWM

The American Jeep Saga

On 27 June 1940, the Ordnance Technical Committee issued a specification for a ¼-ton 4x4 truck (4x4 means all four wheels can be driven). The winner of the competition had to deliver 70 vehicles in 75 days, with the first prototype being delivered in 49 days. There was a weight limit of 590 kg (1,300 lb), payload of 272 kg (600 lb), and the maximum wheelbase (distance between the axles) was 2 metres (80 in). Three companies responded: American Bantam Car Company Inc, Willys-Overland Motors, and Ford. Bantam won the competition.

Each of the competing vehicles had shortcomings (no surprise, given the speed of development). After deliberation, 1,500 vehicles were ordered from each of the three manufacturers for wider testing. Many of the original specifications had been revised - for example, the maximum weight increased to 980 kg (2,160 lb). After the tests, Willys won the production contract for 16,000 vehicles, at least in part due to a lower bid and a larger engine. Bantam was not large enough to handle the required production. Ford agreed to be the second production source and was licensed by Willys to do so. The production vehicle was the Willys model MB.

Precise and reliable production figures are difficult to obtain, but in general terms, there were 2600 – 2,700 Bantams, 1,500 Willys MA (the test model), 360,000 Willys MB (the production model), 3,300 Ford GP (the test model), 277,800 Ford GPW (the licensed Willys MB) produced during the Second World War – a total of 645,300 Jeeps. Some figures quote as high as 680,000 jeeps.

While many accounts state that the *Jeep* name came from the Ford “GP” vehicle, or from the contemporary cartoon character in the *Popeye* comic series, Willys are adamant that they deliberately selected it for their vehicle in competition with other names. However, apparently it was also applied to other small vehicles, such as the Dodge 1/2 –ton Command Car. The prototypes were called the Bantam, Pygmy (Ford) and Quad (Willys). (The source book devotes five pages to this subject!)

There were many modifications applied to the basic vehicle during the war, as well as the addition of special kits, such as an ambulance, and mounting radios and weapons such as machine guns.

After the war, Willys continued to improve the vehicle and produced the MC version, (which is better known as the M38) in 1950-51, and the MD (aka the M38A1) from 1951-1957.

Canada used the Willys and Ford jeeps in the Second World War and continued to use the M38 family successors after the war until replaced by the M151 vehicle in the mid 1970s.

Sources: Clayton, Michael. *Jeep*. North Pomfret, Vermont, David and Charles Ltd, 1982.
Vanderveen, Bart. *The Jeep*. New York, Frederick Warne and Company, 1974.

Jeeps at the CWM

The CWM has a large number of different types of jeeps in their collection. See “The American Jeep Saga” for a general history and “The German Iltis” for details of the current Canadian Forces vehicle. The Willys MB jeep is in Gallery 3.

Ford Model GP 1/4-ton 4x4 Truck

Used by Canada 1941 - 1945

Technical Data (Clayton, Michael. *Jeep*.)

Maximum weight: 1272 kg (2,800 lb)
 Maximum speed: 80 km/hour (50 mph)
 Engine: Ford 45 hp 9N tractor motor
 Gearbox: 3-speed unsynchronised Ford A
 Payload: Driver and three passengers, or 364 kg (800 lb) cargo, and a 454 kg (1,000 lb) towed load



History

The artefact is one of the Ford GP models produced for the extended trials or delivery to the British under lend-lease. A total of 4,458 Ford GPs were built in 1941, before the design was standardised. Later, Ford produced the Willys MB under license and designated it the GPW. The CWM artefact has serial number 14290.

CWM 19970113-014

American Willys-Overland Model MB Jeep

Used by Canada 1941 - 1945

Technical Data (Clayton, Michael. *Jeep*.)

Maximum weight: 1,479 kg (3,253 lb)
 Maximum speed: 104 km/hour (65 mph)
 Fuel consumption: 8.5 km/litre (20 mpg)
 Engine: Willys 2.2 litre (134 cu in) 41.5 kw (54 hp) 4-cylinder L-head gasoline-fuelled
 Payload: Driver and up to three passengers, or 364 kg (800 lb) cargo, and a 454 kg (1,000 lb) towed load



History

More than 361,000 Willys Model MB jeeps were produced during the Second World War, and the vehicle served with most of the Allied armies, including Canada. It was frequently modified to carry machine guns or radios, and could tow a trailer or a light field gun.

CWM 19970113-022 Located in Gallery 3

Truck, Utility ¼ ton 4x4 M38 CDN

The M38 CDN jeep was the first post-Second World War jeep used by the Canadian Army. It is similar to the MB/GPW, but is higher, has larger "bulging" headlights, and a single-piece windshield. It uses the same engine, although geared lower, as the MB/GPW. The Ford Motor Company of Canada in Windsor, Ontario, assembled the M38 CDN between February and November 1952 at an average cost of \$2600 each. Winches were delivered and installed separately by the Ramsey Winch Co. Later, RCME (Royal Canadian Electrical and Mechanical Engineers) installed a convoy lamp as a field modification. The CWM artefact is in UN colours (UNEF 1) and mounts a No. 19 wireless set (radio).

CWM



Truck, Utility ¼ ton 4x4 M38A1 CDN

After the Second World War, the jeep was redesigned as the M38 (Willys "MC"). However, the M38 was soon redesigned and was replaced by the M38A1 (Willys "MD"). This was a different vehicle, with changes to the frame, body, engine, and axles. The M38A1 was the first jeep to change the flat fenders for a more rounded, aerodynamic look. There are three Canadian models of M38A1 designated CDN, CDN2, and CDN3. Ford of Canada made the 38A1 CDN1 in 1953, for the Canadian Army and the RCAF. Kaiser, Canada, made about 800 M38A1 CDN2 in 1967-1968. The M38A1 CDN3 were made in the US in 1970-1971. A number of Canadian M38A1s were modified to carry radios, or serve as ambulances, cable layers and weapons carriers.

CWM 19970113-030



Truck, Utility ¼ ton 4x4 M38A1 CDN3

The M38A1 CDN3 differs from the M38A1 CDN2 by using self-adjusting brakes, solid-state directional flashers, and changes to the front wheel bearings and hubs. While in the Canadian Army, the CWM artefact was modified to carry the 106-mm recoilless rifle anti-tank gun.

CWM 19970113-035



Canadian Ford Model C11ADF Station Wagon Field Marshal Alexander's Command Car

Used 1941 – 1947

Technical Data for unmodified station wagon (Gregg, William. *Canada's Fighting Vehicles, Europe 1943-45.*)

Maximum weight: 2,323 kg (5,110 lb)
Maximum speed: 112 km/hour (70 mph)
Maximum fording depth: 0.45 m (18 in)
Fuel consumption: 13 mpg
Engine: Ford 8-cylinder V8 95 hp



History

The type C11ADF was based on the 1941-42 Ford wood-bodied station wagon. It was issued in limited numbers to army headquarters for use in terrain where a lighter staff car was unsuitable. The vehicle had space for five passengers and a hard top with four doors plus the rear door, but a number were subsequently modified in the Royal Ordnance Corps or Royal Electrical and Mechanical Engineers workshops for special purposes (such as general's command cars or for the Special Air Service). The vehicle can be identified by its 9.00x13-inch flotation tires.

This car was originally built in Canada. The number on the hood is a restoration error and should read M1308323. Sir Harold George Alexander, Field Marshal Viscount Alexander of Tunis, used it when he was in North Africa, Sicily, and Italy during the Second World War. When he became Governor-General of Canada in 1946, he brought the car to Canada with him, but found it unsuitable for the climate, and traded it to Ford of Canada for an enclosed car. Ford later donated the car to the CWM. The car reputedly had the same driver while in Alexander's service, travelled 180,000 miles (288,000 km), had four engine changes, and many overhauls.

The vehicle is fitted for operations in the desert, with a radiator condenser, water cans and rear windshield. The doors were welded shut to add strength to the body when the roof was removed.

CWM 19490003-001

British Brockhouse ¾-ton Office Trailer General Crerar's Office Trailer

Used 1944 – 1945

History

General H.D.G. Crerar was appointed commander of the First Canadian Army in February 1944. He immediately ordered a new caravan mounted on a Diamond T 975 truck chassis and an office trailer. This caravan included his quarters – including a bedroom, wash area and personal office. This could be expanded using a tent on the side of the truck. The truck, caravan and trailer came to Canada after the war, but were disposed of without Crerar's knowledge. The truck has since disappeared, but William Gregg purchased the caravan body itself and it forms part of the Gregg Collection at the RCA museum in Shilo.



The Brockhouse Victoria Works manufactured the office trailer. It was presented to the CWM in 1959 and is in excellent condition. General Crerar used it as an office and conference room. It was the site of meetings between Crerar, Field Marshall Montgomery, General Eisenhower, and General Bradley. King George VI and Winston Churchill are also recorded as visitors to the trailer. (From "Wheels and Tracks" magazine, No 7.)

CWM 19590017-001

Canadian GMC 1543 Modified Conventional Pattern Truck

Used by Canada 1940 – 1945

Technical Data

Maximum weight:	5,727 kg (12,600 lb)
Engine:	6-cylinder 63 kw (85 hp) gasoline-fuelled
Payload:	2,727 kg (6,000 lb)

History

During the Second World War, Chrysler, Ford, and General Motors produced more than 300,000 Modified Conventional Pattern trucks in Canada. Most of the trucks used a standard commercial chassis, but were frequently equipped with a right-hand drive in response to a British specification. The GMC 1543 has rear wheel drive only, and does not have enough power for off-road use.

The trucks were widely by the Canadian Army in Canada, as a general cargo carrier.

CWM 19970113-019



Canadian Military Pattern (CMP) Vehicles

Used by Canada 1940 – late 1950s

At the beginning of the Second World War, Britain was slow to order equipment from Canada, but after the defeat at Dunkirk when most of the British Army vehicles were left behind in France, almost 1/3 of British contracts were let in Canada. One area where a major contribution could be made was in the automotive field, converting car factories to producing military vehicles.

The trucks that came to be known as the Canadian Military Pattern (CMP) were designed to British specifications. Canadian government and senior military officer's insistence on "doing it like the British" caused considerable difficulties, because Canadian production techniques were significantly different to those in Britain. Nevertheless, both Ford of Canada and General Motors cooperated in the basic design, with the aim of having as complete interchangeability of parts as possible. The designs and chassis were standardised and, although each manufacturer used their own engines and running gear, the snub-nosed cabs and many parts were interchangeable.

Of the almost 900,000 military vehicles built in Canada during the war, almost 410,000 were the Ford / GM CMP pattern.

There were 4x2, 4x4, 6x4, and 6x6 versions (4x2 means four wheels with two driving, 4x4 means four wheels with all four wheels capable of driving, etc.)

The truck chassis were standardised into 101-inch wheelbase for the 8-cwt (cwt = hundredweight = 112 lb (50.9 kg)) and 15-cwt trucks, 134-inch wheelbase of the 30-cwt and some 3-ton trucks, and 158-inch for the four-wheeled 3-tonners and 160-inch for the six-wheeled 3-tonners.

There were three basic styles of cab: No 11, No.12, and No.13. Since the cabs were standard for all sizes of vehicle, they may appear outsized on the smaller trucks.

In 1940, the Steel Body Manufacturers Association was formed from all the companies capable of making steel truck bodies. By fitting a wide range of rear bodies with an even greater variety of installed equipment, the vehicles filled many different functions, some of which were quite specialised. For example, over 60 different bodies were fitted to the 15-cwt chassis.

CMP vehicles served in almost every theatre of war, including North America, Northwest Europe, the North African desert, the Russian steppes, and the New Guinea jungles. The Canadian Army used them until they were replaced by American pattern vehicle in the 1950s. Even today, in many parts of the world, CMP trucks are still in commercial use in farming, fire fighting and logging.

William Gregg's "Blueprint for Victory" (Rockwood, Canadian Military Historical Society, 1981.) is an excellent account of the wartime production of military vehicles in Canada.

CMP Vehicles at the CWM

The CWM has a large number of CMP vehicles, some of which are on display in the Lebreton Gallery. William Gregg's "Canada's Fighting Vehicles, Europe 1943-45" (see sources) is an excellent source of technical data on the CMP vehicle variants. Many of the vehicles were donated to the CWM in memory of Mr. Jack Guthrie. Technical data is from Gregg, William. *Canada's Fighting Vehicles, Europe 1943-45*.

Chevrolet CMP C-8 8-cwt 4x2 Wireless Truck

This early version, the 4x2 Chevrolet 8-hundredweight (cwt) General Service truck model 8420, was widely used in Canada, but only in limited numbers overseas. Although more than 9,800 were built (including Ford production), its two-wheel drive limited the vehicle to good roads. This truck is fitted with a No. 19 Wireless Set (radio), with its batteries and aerial. A light "chorehorse" battery-charging generator is mounted between the cab and the body. Two men and an artillery board (a plotting device) are carried in the back of the vehicle.



Technical Data

Maximum weight:	2,545 kg (5,600 lb)
Maximum speed:	80 km/hour (50 mph)
Engine:	General Motors (85 hp) 6-cylinder in-line gasoline
Payload:	609 kg (1,340 lb)
CWM	

General Motors CMP Field Artillery Tractor

The Field Artillery Tractor (FAT) was used to tow the 25-pounder gun or the 17-pounder anti-tank gun. The rear of the vehicle has compartments for tools and equipment. The spare tire, camouflage net, and other bulky items could be carried on the back deck. Canada built more than 22,000 FATs, and Canadian troops used them in Italy and in Northwest Europe.



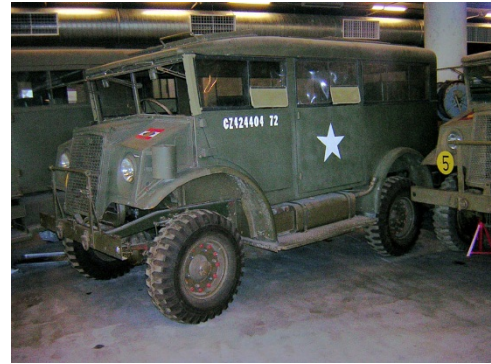
Technical Data

Maximum weight:	5,636 kg (12,400 lb)
Maximum speed:	74 km/hour (46 mph)
Engine:	Ford 71 kw (95 hp) V8 gasoline-fuelled
Payload:	Driver and five passengers. Normally towed a Field Artillery Trailer and a 25-pounder, or a 17-pounder gun.

CWM 19970113-004

General Motors CMP 8-cwt Truck, Heavy Utility, Personnel, Type C8A

This version, the C8A Truck, Heavy Utility, Personnel (HUP) was a light 4x4 vehicle for transporting personnel. It was frequently used as a troop carrier or office vehicle in staff headquarters. Other versions were radio trucks, cipher offices, computer vans, commander's vehicles and ambulances. There are two HUP in Lebreton– the one with the white star is a personnel carrier and the other is model 1C11, which was designed as a command vehicle and wireless (radio) truck.



Technical Data

Maximum weight: 3,410 kg (7,500 lb)
 Maximum speed: 80 km/hour (50 mph)
 Engine: General Motors (85 hp) 6-cylinder in-line gasoline
 Payload: Driver plus six passengers.

CWM 19950103-004 and 19970113-005

Ford CMP 15-cwt 4x4 General Service Truck

The 15-cwt 4x4 general service truck was widely used in Canada and overseas as a general load carrier. It was used by all arms – infantry, armour, engineers, and artillery – and could be used in the forward areas because of its low silhouette and short wheelbase.

CWM 19740080-001



Ford F15A CMP 15-cwt 4x4 Wireless (Signals) Truck

This 15-cwt truck is equipped with a van body and was used as radio and communications vehicle. It would normally have been employed at brigade or division headquarters, or in other rear area units. It could be fitted with a number of different wireless sets (radios). The vehicle would have had several sets of radio batteries and a small generator to charge them. The CWM artefact is a rare vehicle and mounts a No. 52 wireless set. The vehicle markings are from HQ First Canadian Army Signals.

CWM 19990220-005



Ford F15A CMP 15-cwt "KL" Machinery Truck

The Royal Canadian Electrical and Mechanical Engineers used this version, the 4x4 15-cwt "KL" Machinery Truck to carry out welding repairs in the field. It has a 300-ampere electric welder, with a portable grinder, welder's table, welder's screen, and other accessories. It also carried oxy-acetylene welding equipment.

Technical Data

Maximum weight: 5,490 kg (12,080 lb)
Maximum speed: 82 km/hour (51 mph)
Engine: Ford 95 hp V-8 gasoline-fuelled
CWM 19990220-007



General Motors CMP C60S 3-ton Light Breakdown Tractor

The Royal Canadian Electrical and Mechanical Engineers used this version, the 4x4 3-ton Light Breakdown Tractor, to recover damaged vehicles and light guns and tow them to a workshop for repair. The truck has two booms, each with its own 2,273-kg (5,000-lb) capacity winch. The booms could be used separately to each side, or together over the rear of the vehicle.

Technical Data

Maximum weight: 6,636 kg (14,600 lb)
Maximum speed: 64 km/hour (40 mph)
Engine: General Motors 63 kw (85 hp) 6-cylinder in-line gasoline-fuelled
CWM 19950103-003



Canadian Ford 2-ton Half-track

Used by Canada 1936 – 1945

History

Mechanisation of the Royal Canadian Artillery began in 1929, and continued into the 1930s. In 1936, James Cunningham, Son, & Co of Rochester, New York, was contracted to produce four half-tracked gun tractors. The track sets were mounted on standard 1936 Ford V8 2-ton truck chassis. The half-tracks performed well in trials in Shilo, Manitoba, but because the weather was dry, no tests were carried out in muddy conditions.



The half-tracks were assigned to "C" Battery, Royal Canadian Artillery, until the unit went overseas in 1939. The vehicles were reasonably well regarded, although there were complaints about the stowage. When used as a gun tractor, the boxes from 18-pounder gun limbers were installed on the flat bed to carry ammunition, tools, and equipment. By 20 October 1938, the half-tracks had travelled an average of 4,378 miles. Their tracks had stretched and had been shortened and exchanged. In February 1940, two were reassigned to the Princess Patricia's Canadian Light Infantry and two were at the Queen's Own Cameron Highlanders of Canada.

When the CWM artefact was found in a farmer's field, a tree was growing up through the floor of the cab and out the windshield. It has been restored and is the only known surviving model.

CWM 19890308-001

Canadian Marmon-Herrington Model SDF 26F RCAF Crash Tender

Used by Canada 1936 – 1945

Technical Data

Model	S-D F26F
Gross weight	11,818 kg (26,000 lb)
Chassis Weight	3,204 kg (7,050 lb)
Tank Capacity	2,270 litres (500 gallons) (foam/water mixture)



History

A crash tender is a fire truck specially equipped to respond to an aircraft accident. Since the crash site may not be close to a water supply, the truck carries its own pumps, water and foam. The tender has all-wheel drive, to give the vehicle a cross-country capability. The two 50-pound (23 kg) carbon-dioxide cylinders on each side of the truck would be used to put out the fire. Then a water and foam mixture from the 500-gallon tank would be applied. This would prevent the fire from being restarted by the hot metal of the crashed aircraft. This Marmon-Herrington crash tender served with the Royal Canadian Air Force at Trenton, Ontario from 1941 to 1945. The artefact was manufactured in 1944.

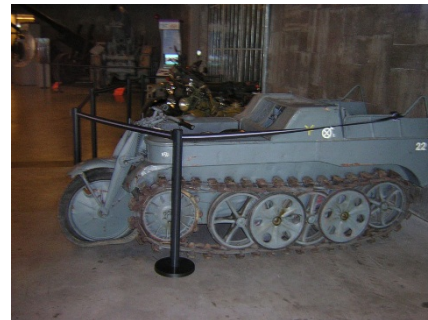
CWM 19700157-001

German Kleine Kettenkraftrad Sd Kfz 2 Half-tracked Cargo Carrier

Used 1940 – 1945

Technical Data (Ellis. *Military Transport of World War 2*)

Maximum weight: 1,560 kg (3,432 lb)
 Payload: 325 kg (715 lb)
 Maximum speed (road): 80 km/hour (50 mph)
 Range: 400 km (250 mi)
 Engine: Opel 1.5 litre 4-cylinder, 36 hp



History

This unique vehicle, essentially a half-track motorcycle, was designed in 1940 as a light transport vehicle for paratroops. It was built to the maximum dimensions that could fit in a German Junkers 52 transport aircraft. The front forks and fittings were from a standard motorcycle, and the tracks were a small-scale version of those fitted to normal half-tracks. Seats were provided for the driver, and two passengers or equivalent cargo. It was first used in the airborne landings at Crete in 1941, and remained in service until the end of the war. Other versions included cable layers and light gun tractors. More than 8,000 were manufactured.

CWM 19740534-001

German Volkswagen Iltis Jeep

Used by Canada 1983 - 2006 (produced by (Bombardier)

Technical Data (DND)

Weight: 1,550 kg (3,410 lb)
 Maximum speed: 100 km/hr (62.5 mph)
 Engine: 74 hp, 4 cylinder, 1.7 litre, gasoline

History

The Iltis is a 4x4 light utility vehicle used for command, liaison, reconnaissance, and communication functions. It can be equipped to lay cable (the CWM artefact), mount weapons, and carry casualties. It is air-transportable in a CC-130 Hercules aircraft. The Canadian Army acquired 2,500 Iltis vehicles between 1984 and 1986.



On New Year's Eve 1994, Privates Philip Badanai (Royal Canadian Regiment) and John Tescione (48th Highlanders) were returning from a UN escort mission through a small village in Croatia, when 25 Serb soldiers suddenly opened fire with small arms, hitting the vehicle more than 50 times. Tescione was hit five times, including twice in the head. Badanai was wounded twice, but managed to continue driving for 15 kilometers until he reached base. Miraculously, both survived the ordeal. Private Badanai was awarded the Meritorious Service Medal for his quick action (DND).



CWM 19950050-001

Section 4 - Amphibious and Over-snow Vehicles

American DUKW-353 Amphibious Truck

Used by Canada 1942 - 1960

Technical Data

Maximum weight:	8,805 kg (19,370 lb)
Maximum land speed:	80 km/hour (50 mph)
Maximum water speed:	8 km/hour (5 mph)
Payload:	2,273 kg (5,000 lb)
Engine:	GMC 6-cylinder(269.5 cu in overhead-valve gasoline



History

The 2½-ton 6x6 Amphibian Truck, more commonly known as the DUKW, was designed to ferry stores and troops from ships anchored offshore directly over the beach and into the supply lines. The vehicle was based on the General Motors CCKW-353 truck chassis, with the addition of a propeller, rudder, and bilge pumps in a watertight steel hull.

DUKWs could be linked together in ferries to carry heavy or oddly shaped loads (such as aircraft). It was capable of surviving 6 metre (20 ft) high surf. More than 21,000 were built. Some DUKW were modified to carry and fire artillery or rockets while afloat, but accuracy was almost non-existent. Canadian troops used the DUKW in the battles of the Scheldt (1944) and the Rhineland (1945).

The photo is from the CWM web site.

CWM 19970113-012

American M29C Weasel Amphibious Truck

Used by Canada 1943 - 1970

Technical Data (Woods, Jeff. Weasel, Carrier Cargo M29, Carrier Cargo M29C. London, ISO Publications, 1977.)

Maximum weight: 2,714 kg (5,971 lb)
Maximum land speed: 58 km/hour (36.4 mph)
Engine: Studebaker 70 bhp 6-cylinder
Track width: 50 cm (20 in)
Payload: 545 kg (1,200 lb)



History

The M29 *Weasel* was a light-tracked vehicle that was designed and built by the Studebaker Corporation as an over-snow vehicle. It was an excellent design and remained in use for many years after the Second World War, especially in Canadian and Norwegian Arctic.

The M29C had a better-shaped body, was amphibious, and had a cable-controlled rudder at the rear. There were floatation chambers at the front and rear. The tracks provided the propulsion in the water. It was used extensively in the operations to capture Antwerp in late 1944.

CWM 19740137-001

Canadian Robin-Nodwell RN 25-35 Flex-track Over-snow Vehicle

Used by Canada 1968 – 1985

History

This 12-passenger, flexible-track cargo carrier was manufactured by Robin-Nodwell, of Calgary, Alberta. Powered by a six-cylinder engine with an automatic transmission, it was steered using two control sticks that applied the track brakes. A limited number were used by DND in the North for carrying cargo and passengers. Fitted with boarding stairs, it was also used by RCAF Air Transport Command for aircraft ground support in the North.



CWM 19850172-001

Canadian Bombardier Military Half-tracked Snowmobile

Used by Canada 1942 – 1960

Technical Data

Weight: 2,727 kg (6,000 lb)
 Maximum speed (road): 56 km/hour (35 mph)
 Range: 320 km (200 mi)
 Engine: Ford 95 hp V8 90° L-Head gasoline
 Payload: Two crew and six passengers



History

The Bombardier Military Snowmobile was designed to transport personnel and cargo over snow-covered terrain. Production started in 1942, and was based on Bombardier's existing eight-passenger commercial snowmobile bus. A total of 129 vehicles were produced, and used in Canada, Scotland, and the Soviet Union. While the vehicle performed reasonably well in snow, the skis were never completely satisfactory. They had a short life, were easily damaged, and under certain snow conditions, could make the vehicle difficult to control. No. 18 Company of the Royal Canadian Army Service Corps used this snowmobile until the late 1950s.

CWM 19740305-001

Canadian Arsenals Mk III Penguin

Used by Canada: 1946 – 1960

Technical Data

Maximum weight: 5,000 kg (11,000 lb)
 Maximum speed: 40 km/hour (25 mph) on hard surface
 Engine: Cadillac 110 hp 90° V8 water-cooled L-head gasoline
 Payload: Driver and four passengers, or 545 kg (1,200 lb) cargo



History

Canadian Arsenals designed the Penguin as an all-season personnel and cargo carrier for the Canadian Northern regions. Its wide tracks and low ground pressure gave it excellent mobility in all types of terrain. Between February and May 1946, the Canadian Army used an earlier version of the Penguin to make a 5,000 km (3,130 mi) journey from Fort Churchill, Manitoba, via Cambridge Bay and Fort Nelson to Edmonton, Alberta. The exercise gave the army valuable experience in northern operations. The CWM artefact is missing the tracks.

CWM 19970113-018

Canadian Canadair CL-70 “RAT” Over-snow Vehicle

Used by Canada 1957 – 1958

Technical Data

Length:	3.76 m (12 ft 4 in)
Width:	1.22 m (4 ft)
Empty Weight:	672 kg (1,479 lb)
Payload:	272 kg (600 lb)
Engine:	Volkswagon 30 BHP car engine
Transmission:	Volkswagon four-speed gearbox
Speed:	30 km/h (20 mph) on packed snow; 5 km/h (3 mph) in water.



History

Officially known as the Tractor, Snow, Light, Articulated, the RAT (Remote Articulated Tracked Vehicle) was designed in 1956 by Canadair in Cartierville, Quebec for use in deep soft snow. It was intended to carry a 272 kg (600 lb) payload, or tow infantry sleds or toboggans.

The vehicle was amphibious and air-droppable, and performed extremely well in snow, swamp, sand, and water, but was mechanically unreliable. A 35-hp Volkswagen engine drove both units through a unique articulating transfer joint. The front unit contained the engine, transmission, driver, fuel, and controls. The rear unit contained the payload. The tracks in both units were driven by a common drive shaft. The vehicle was steered by tightening or loosening cables that controlled the degree of articulation between the units.

36 RATs were built, six prototype CL-61s and the rest CL-70s. Of these, 24 went to the Canadian Army, two each to the Swedish Army and the New Jersey Mosquito Control Authority, and one each to the Canadian Department of Mines and Resources and Department of Northern Affairs.

CWM 19780116-004

German Raupenschlepper-Ost RSO-01 Cargo Carrier

Used 1942 - 1945

Technical Data (Ellis. *Military Transport of World War 2*)

Weight: 5,500 kg (12,100 lb)

Maximum speed: 17 km/hr (10.6 mph)

Engine: Steyr V8 70 bhp

History

The Raupenschlepper-Ost (Tracked-Tractor-East) was an attempt to produce a vehicle that could cope with the Russian winter. It was fully tracked and had tank-like torsion bar suspension and tracks. The high ground clearance let it cope with mud and swamps. Special 600-mm wide tracks could be fitted for operation in snow or slush, but conventional narrow 340-mm wide tracks were normally fitted. The vehicle was rated for a 1.5 ton payload, and was frequently used to tow anti-tank guns and light artillery. Almost 28,000 were produced. In 1945, it was used in small numbers in North-west Europe.

CWM



German Volkswagen Type 166 Schwimmwagen

Used 1942 - 1945

Technical Data (Ellis. *Military Transport of World War 2*)

Weight: 1,362 kg (3,410 lb)

Maximum speed: 80 km/hr (50 mph) road,
10 km/hr (6 mph) water

Engine: Volkswagen Boxer 1131cc 4-
cylinder / 25hp gasoline

Fuel consumption: 9.5 litres/100km

History

The *Schwimmwagen* was an amphibious version of the Standard Volkswagen Type 82 *Kubelwagen*. It had a bath-shaped pressed steel body with a three-bladed propeller at the rear. It was designed for the Eastern Front, but also appeared in North-west Europe.

On land, the vehicle was driven normally, but in the water the gears were placed in neutral, the propeller arm was lowered, a sprocket engaged the crankshaft end and drove a chain that turned the propeller. A total of 14,267 *Schwimmwagen* were produced

CWM 19500003-001



Section 5 - Naval Equipment

Sources

Campbell, John. *Naval Weapons of World War Two*. London, Conway Maritime Press, 1985.

Naval Mines

Produced by all major nations

Used 1776 - Present

In 1776 an American, David Bushnell, invented the sea mine. It was a simple watertight wooden keg, loaded with gunpowder, which hung from a float and he called a torpedo. In 1777, an attempt to use the kegs to destroy a British fleet anchored in the Delaware River near Philadelphia failed.



The first large-scale use of mines was in the First World War. At that time, a typical mine consisted of a spherical shell containing up to 145 kg (320 lb) of explosive and a floatation chamber. The mine was attached to an anchoring platform by a cable, and floated just below the sea surface. Surrounding the sphere, were a number of glass-covered fuses called "horns". When a ship hit the mine, the glass would break, triggering a fuze, and the mine would explode.

Mine development continued into the Second World War, when the mine could also be triggered by the magnetic field surrounding the ship, or the noise of its propellers. Mines were laid by ships and were also dropped from aircraft.

The CWM has several examples of typical mines. Some are cut away to see the internal operations.

CWM 19880001-732, 19890002-220, and 19680010-001

British (Swiss) 20-mm Mk 4 Oerlikon Gun on Mk V (RCN) Mounting

Used by Canada 1939 – 1945

Technical Data *(Naval Weapons of World War Two.)*

Weight of gun: 92 kg (203 lb)
 Weight of mounting: 356 kg (784 lb)
 Maximum AA Ceiling: 3,050 m (10,000 ft)
 Projectile weight: 0.123 kg (0.272 lb)
 Rate of fire: 450 rpm (250 rpm practical)
 Ammunition types: HE, incendiary, semi-AP



History

The 20-mm Oerlikon heavy machine gun was produced in higher numbers than any other anti-aircraft weapon of the Second World War. The US alone manufactured 124,735 guns. Starting in 1939, Oerlikons were mounted on almost every class of ship in the British and Commonwealth navies, including many merchant ships, and there were 55,000 guns in service in those navies in September 1945. It was easy to maintain and had a good rate of fire. However, in the Pacific, it was unable to defeat Japanese Kamikaze attacks and was replaced by the 40-mm Bofors gun.

The CWM artefact is mounted on a Mk V (RCN) mounting (CAN 452), which was manufactured by Regina Industries Ltd, in Regina, Saskatchewan in 1943. The company manufactured more than 500 twin and 1,200 single mounts during the war.

CWM 19590026-002

British QF 1-pounder Mk 1 "Pom Pom"

Used 1885 - 1918

Technical Data

Weight of gun: 186 kg (410 lb)
 Rate of fire: 300 rounds/min
 Maximum ground range: 2,741 m (3,000 yd)
 Projectile weight: 454 gm (1 lb)
 Ammunition types: HE, AP



History

In 1885, the Maxim Gun Company, with the Vickers Company, developed a 37-mm (1.46-in) automatic gun for the Royal Navy for defence against torpedo boats. Although the British only bought a few, Maxim sold many to other countries, including France who later sold them to the Boers in South Africa, who used the gun with devastating effect against the British during the Boer War in 1902. With a rate of fire of 300 rounds per minute, its heavy rapid thumping gave the gun its "pom-pom" nickname, which is still applied to heavy automatic weapons today. Some guns were mounted on high-angle mountings as anti-aircraft defence during the First World War.

CWM 19890086-001

British Vickers-Maxim 1¼-pounder 37 Automatic Gun Mark III

Used 1885 – 1918. Used by Canada

This Vickers-Maxim 1¼-pounder (gun number 6819) was manufactured in 1905 and mounted on the Canadian Fisheries Service vessel CGS *Canada* from approximately 1902 to 1914. The *Canada* was similar to a fast naval sloop of the period. Vickers Sons and Maxim, at Barrow-in-Furness, built her in 1904. *Canada* was 200 feet long, could steam at 22 knots, was armed with four small quick-firing guns, and carried a complement of 75 officers and men. (Fisheries and Oceans Canada)



The *Canada* marked the transition from traditional wooden schooners to modern steel cruisers, playing a crucial role as Canada formulated its young navy. *Canada* was the fastest ship in the Fisheries Protection fleet. It was Canada's first successful naval training vessel, and the first Canadian naval vessel to train with the Royal Navy. She was sold to the Florida Inter-Island Steamship Company in 1924, and sank under mysterious circumstances on 2 July 1926.

CWM 19440021-001

British Naval 2-Pounder Mk VIII Gun on Single Mounting

Also produced in Canada.

Used 1939 – 1945. Used by Canada.

Technical Data (*Naval Weapons of World War Two..*)

Calibre:	40 mm (1.575 in)
Rate of fire:	96-98 rpm controlled, 115 rpm automatic fire
Range:	6,220 m (6,800 yards)
AA ceiling:	3,960 m (13,000 ft)
Weight of projectile:	0.764 kg (1.864 lb)



History

Before the Oerlikon 20-mm anti-aircraft gun became available in quantity, the 2-pounder Mark VIII gun was the Royal Canadian Navy's main defence against low-flying aircraft. In addition to British production, the Dominion Bridge Co. Ltd, in Vancouver, BC, manufactured 843 guns during the Second World War, starting in September 1942. The Canadian Locomotive Co., Kingston, Ontario produced the 2-pounder Mk VIII single mounting. The mounting was comparatively light, of an orthodox type with riveted carriage and presented no special manufacturing difficulties. A total of 455 had been delivered by 30 September 1943, and production was continuing at the rate of 30 mountings per month. The 2-pounder gun was mounted on the Flower class corvettes. The CWM artefact was mounted on HMCS Kamloops. The ship and the gun appeared in the movie "Corvette K-225" starring Randolph Scott in 1943.

CWM 19750084-029

British (Swedish) Naval 40-mm L/60 Bofors Gun in Mk VC Boffin Mounting

Designed in Sweden. Also produced in Canada.

Used 1943 – Present. Used by Canada.

Technical Data (*Naval Weapons of World War Two*)

Weight of gun: 508-528 kg (1,120-1,163 lb)

Muzzle velocity: 881 m/sec (2,890 ft/sec)

Rate of fire: 80 rounds/min

Maximum ground range: 9,830 m (10,750 yd)

Anti-aircraft range: 7,160 m (23,500 feet)

Projectile weight: 0.894 kg (1.97 lb)

Ammunition types: High explosive, semi-armour-piercing



History

As aircraft performance increased during the Second World War, the 20-mm Oerlikon anti-aircraft gun became less effective and was replaced by the 40-mm Bofors. The Boffin was an adaptation of the Canadian Oerlikon twin Mark V or Mark VC 20-mm mounting to use a single 40-mm Bofors gun. The turret-type mounting was shielded, hydraulically powered, relatively lightweight, and could be mounted on small warships. After the war, Bofors were mounted on various RCN ships including the carriers HMCS *Magnificent* and HMCS *Bonaventure*. When the ships were scrapped, the guns were put in storage until they were issued to the Royal Canadian Artillery as a low-level air defence weapon in the 1970s.

When 4th Air Defence Regiment, RCA, received new twin 35-mm guns in 1989, the Boffins were returned to the navy. Being available (and therefore cheap), they were selected as the main armament on the new *Kingston* class Maritime Coastal Defence Vessels (MCDV). Twelve MCDV were commissioned between 1995 and 1996 and are proving very successful. All but two members of a crew of 31-37 sailors on each ship are naval reservists, and the Boffin provides a practical method of training them in gunnery. After more than sixty years, the Boffin is still in Canadian service.

The CWM artefact, Boffin cradle mounting CAN 111 started life in 1943 as a 20-mm twin Mk V mounting. It now mounts Bofors barrel LL32594.

CWM 19590026-001

British (Swedish) Naval 40-mm Mk XI Bofors Guns in Twin RP 50 Mk V Mounting

Designed in Sweden. Also produced in Canada.

Used 1937 – 1970. Used by Canada.

Technical Data (*Naval Weapons of World War Two*)

Weight of gun: 508-528 kg (1,120-1,163 lb)

Weight of mounting: 6,500 kg (14,300 lb)

Muzzle velocity: 881 m/sec (2,890 ft/sec)

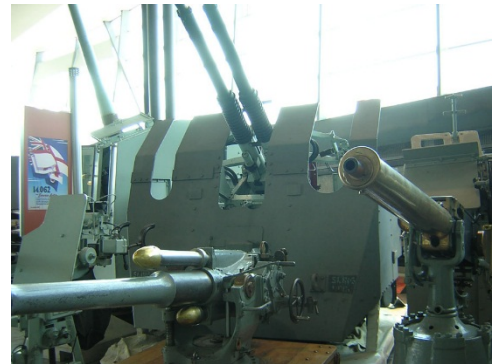
Rate of fire: 120-140 rounds/min

Maximum ground range: 9,830 m (10,750 yd)

Anti-aircraft range: 7,160 m (23,500 feet)

Projectile weight: 0.894 kg (1.97 lb)

Ammunition types: High explosive, semi-armour-piercing



History

Recognised as the best light anti-aircraft gun in the Second World War, the 40-mm Bofors was mounted on many classes of British and Canadian warships, including Canadian Tribal class destroyers and some frigates. During the Cold War, it was mounted on *Prestonian* class frigates. Both the Germans and Japanese used variations or copies of the design during the war, and Bofors 40-mm guns are still in service with some countries today.

In 1940, Dominion Foundries and Steel Ltd, and Atlas Steels Ltd. of Welland, Ontario, started producing Bofors gun barrels in Canada, eventually reaching a peak production of 1,500 barrels per month in 1943. By October 1941, nearly 2,500 barrels had been shipped overseas. The Otis-Fensom Elevator Company began producing complete Bofors mountings in 1942, with a total of 250 being produced by late 1943. In 1944, the British Admiralty ordered 500 twin mountings, which were manufactured by the Dominion Bridge Co. Limited in BC.

In the Pacific campaign, the smaller 20-mm guns were not adequate against the Japanese *Kamikaze* attacks. On the other hand, the twin Bofors could put up a curtain of projectiles at a height sufficient to prevent any hostile aeroplane from getting into position to dive-bomb a ship. In anticipation of action in the Pacific, late in the war, some River class frigates of the RCN were refitted with the Mark V twin mounting, and in the early years of the Cold War, the twin RP50 Mark V mountings were standard equipment on the *Prestonian* class frigates.

CWM 19680076-001

British Naval 4-inch Mk XXI Gun on High Angle Mk XXIV Single Mounting

Used by Canada 1945 – 1961. Also produced in Canada

Technical Data (*Naval Weapons of World War Two*)

Calibre:	101.6 mm (4 in)
Weight of gun & mtg:	10,177 kg (22,390 lb)
Rate Of Fire:	up to 15 rounds per minute
Range:	18,150 m (19,850 yd)
Weight of projectile:	15.9 kg (35 lb)
Ammunition types:	HE, starshell (illumination)



History

The Naval 4-inch Mark XXI gun was a lighter version of the Mark XVI naval gun, and approximately 238 guns were manufactured in Britain, with another 135 in Sorel, Quebec. The guns were intended for British Castle class corvettes and Loch class frigates, and for refitted Royal Canadian Navy corvettes. Canadian Pacific Munitions Department Ogden Shops in Calgary produced the Mark XXIV mounting. When the war ended, the order was cancelled, leaving 60 mounts in various stages of production. This artefact, CAN 42, was completed, but was sold to ComDev Ltd., in 1961 for use on their experimental air ballistic range near Stittsville, , in support of NASA's Apollo programme. It was presented to the CWM in 1974.

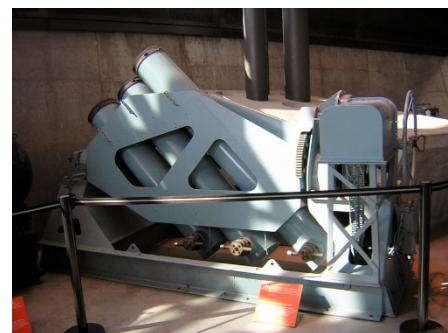
CWM 19740508-001

British Squid Mk IV Anti-submarine Mortar

Used by Canada 1942 – 1980

Technical Data (*Naval Weapons of World War Two*)

Mounting weight:	2,851 kg (6,272 lb)
Projectile weight:	177 kg (390 lb)
Projectile sinking rate:	13.3 m/sec (43.5 ft/sec)
Maximum depth:	274 m (900 ft)
Maximum range:	250 m (275 yd)



History

The Squid 3-barreled 300-mm (12-inch) mortar was the best anti-submarine weapon of the Second World War. Ordered directly from the drawing board in 1942, it was first installed in the corvette HMS *Hadleigh Castle* in September 1943. In July 1944, HMS *Loch Killin* sank the first submarine (U-333) to be destroyed by a Squid. Many RCN destroyers, destroyer escorts, and frigates were equipped with one or frequently two Squids. Normally fired ahead of the ship, the Squid could be aimed up to 30° either side of the bow. The elevation of the tubes could be varied to produce different impact patterns. The pattern was intended to encircle the target and the simultaneous explosions would crush the pressure hull of the submarine.

CWM 19760561-026

German *Molch* (Salamander) Class Midget Submarine

Used 1944 – 1945

Technical Data (Wisniewski, George. *Development of Germany's Midget Submarines in the Second World War*. Internal CWM report dated 4 May 1982. (CWM Archives 58A21.11))

Displacement:	10¾ tons
Length:	16.7 metres (35½ feet)
Beam:	1.6 metres (3½ feet)
Propulsion:	13-hp electric motor
Range/ Speed:	43 nautical miles at 5 knots
Dive Depth:	27 metres (90 feet), if the boat managed to submerge
Armament:	Two G7e torpedoes



History

During the Second World War, Germany developed four major classes of midget submarines:

- The *Marder (Neger)*, which was a manned torpedo with a second torpedo slung underneath
- The *Biber*, which had both an internal combustion engine and an electric motor for submerged operations
- The *Molch*, which was similar to the Biber with only an electric motor
- The two-man *Hecht and Seehund* (also known as the Type XXVII U-boats).

The front section of the Molch housed the battery. The operator sat behind the battery. The two trim tanks at the front and rear of the boat were too small, making it almost impossible to make the boat submerge, so attacks were generally carried out while running with the hull just submerged and the conning tower above water. The electric motor was located behind the operator. His controls included a magnetic compass, and a periscope that could only rotate 30° either side of the centre line.

Deschimag AG Weser in Bremen built 390 (some accounts say 393) *Molch* one-man submarines. Large numbers of *Molch* were stationed in Norway and Denmark, and by January 1945, *Molch* units were stationed at various points between Rotterdam and Hellevoetsluis in the Maas River delta. Generally, the boats would sortie at dusk, and return by dawn (if at all).

The CWM artefact was brought to Canada after the war by the author, Farley Mowat. The story is recounted in “My Father’s Son”. It spent many years at the Maritime Museum in Halifax before coming to the CWM. The rear casing of the submarine was damaged when part of the building it was stored in fell on it.

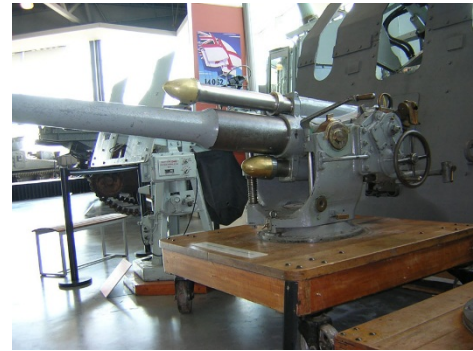
CWM 19680034-002

German 88-mm/30 Ubts L/30 Submarine Deck Gun

Used 1898 – 1918

Technical Data (Gröner *German Warships 1815-1945*.)

Calibre: 88 mm (3.46 in)
 Weight of gun & mtg: 2,284 kg (5,025 lb)
 Rate of fire: up to 15 rds/min in a calm sea
 Maximum range: 11,800 m (12,900 yd)
 Projectile weight: 10 kg (22 lb)
 Ammunition types: HE. The boat carried 160 rounds.



History

The 88-mm/30 Ubts L/30 was designed at the end of the nineteenth century for use on coastal and river gunboats. It was later adapted for use in First World War U-boats. The CWM artefact was originally installed in the Type UB III coastal U-boat UB 91. The boat was laid down on 23 September 1916, and commissioned on 11 April 1918. Commanded by Wolf-Hans Hertwig, UB 91 carried out two patrols, sinking five ships of a total weight of 16,448 tons. UB 91 surrendered on 21 November 1918, and was broken up at Briton Ferry in 1921. UB 91 displaced 516 tons on the surface and 651 tons submerged. She was capable of 13.6 knots on the surface (8 knots submerged), and had a range of 14,464 km (9,040 miles) at 6 knots on the surface (88 km (55 miles) at 4 knots submerged). She carried ten torpedoes, and could dive to a maximum depth of 75 metres (246 ft). UB 91 had a crew of 34 all ranks. (Source: U-boats.net)

CWM19390002-558

German 77-mm QF FK 96 n/A Field Gun on British Naval Mounting

Used 1896 – 1918

Technical Data (Nash. *German Artillery 1914-1918*.)

Calibre: 77 mm (3.03 in)
 Weight of gun & mtg: 1,158 kg (2,548 lb)
 Rate of fire: up to 5 rounds/min
 Maximum range: 8,400 m (9,186 yd)
 Projectile weight: 6.5 kg (14.3 lb)
 Ammunition types: HE, shrapnel, AP, illumination.



History

The 77-mm Feldkanone 96 n/A was introduced into German service in 1896, modified in 1905 and 1906 and was the main gun in the German Field Artillery until replaced in 1916. The CWM artefact's gun barrel was manufactured in 1906, and was probably the 635th gun made in that year. The crest on the barrel is German. The CWM artefact was either captured by the British or supplied to them as apart of the reparations after the First World War. It was taken into service as the QF 77 mm Mk I gun, and was been mounted on a pedestal for naval or coast defence use. Markings on the gun indicate that it was taken into service in 1918.

Section 6 – Other Equipment

American McDonnell CF-101B “Voodoo”

Used by Canada 1961 - 1984

Technical Data (RCAF)

Crew:	2 (pilot, navigator)
Maximum Speed:	1,220 knots (1,963 km/h)
Service Ceiling:	51,000 ft (15,545 m)
Range:	1,550 m (2,494 km)
Weight:	39,900 lbs (18,097 kg) gross
Power Plant:	2 11,990 lbs thrust Pratt & Whitney J-57-P53/55 turbojets (14,990 lbs with (Afterburner)
Armament:	Two AIR-2A Genie nuclear tipped rockets & two AIM-4D Falcon missiles



History

The RCAF acquired 66 Voodoos in 1961 to replace the CF-100 in Air Defence Command. At the time considered one of the world's most formidable fighter aircraft, its high speed, large combat radius, exceptional climb and ability to operate at great altitude gave it unusual striking power. It could carry a wide variety of missiles including the AIR-2A Genie nuclear-tipped rocket.

The RCAF used the two-seat version, which first flew in 1957 and carried a pilot and navigator (weapons system operator). The F-101B was guided to its target via a SAGE (Semi-Automatic Ground Environment) data link. Steering commands and the target's speed, altitude, and heading were transmitted to the navigator without the need for voice communication.

No 425 Squadron, RCAF, first flew the Voodoo in 1961, with five squadrons eventually operating the aircraft. In 1971, the survivors of the original 66 Voodoos were traded for older, but improved F-101's. The McDonnell Douglas CF-18 replaced the Voodoo in 1984.

The CWM artefact served with 410, 416, 425, and 444 squadrons. It was the first Voodoo that General Ray Henault (later Chief of the Defence Staff) flew operationally when he was posted to 425 Squadron.

CWM 20040061-001

German Weather Station “Kurt” set up in Labrador in 1943

Story from www.U-boat.net

History

The U-537 made the only armed German landing on North American soil in the Second World War. Under command of Kapitanleutenant Peter Schrewe, she left Kiel, Germany on 18 September 1943. After a brief stop in Bergen, Norway, she was at sea again on 30 September, proceeding to North America to set up an automatic weather station on the coast of Labrador.

U-537 carried a scientist, Dr. Kurt Sommermeyer, and Wetter-Funkgerät (WFL) number 26 (the sixth in a series of 21 such stations) manufactured by Siemens. It consisted of various measuring instruments, a 150-watt Lorenz 150 FK-type transmitter and ten canisters with nickel-cadmium and dry-cell high-voltage batteries.



On 22 October, U-537 arrived at Martin Bay at the northern tip of Labrador. For the next 48 hours, U-537 lay at anchor while the crew manhandled the 220-pound canisters, along with a tripod and mast, into rubber boats and then onshore. The weather station was set up 400 yards inland on a 170 feet high hill. At 5:40 P.M. on October 23, having ensured that the station was functioning properly, Schrewe set off for an anti-shipping patrol off Newfoundland. His patrol was uneventful, and on 8 December, U-537 returned to Lorient, France. Reports indicate that the weather station sent out normal transmissions every three hours for a few days, but then there was apparent jamming on that frequency (about which nothing is known; no evidence has yet turned up that the Allies learned about the equipment). U-537 was transferred to the Far East and sunk with all hands on board in late 1944 - only Dr. Sommermeyer and a crew member who had left the boat prior to the its transfer to the Far East, survived the war. Thus the station was a secret known only by a handful German seamen and scientists. The station remained unknown until...

The story became known in the late 1970s, when an engineer named Franz Selinger, after his retirement from Siemens, decided to write a history of the German weather service. Among Dr. Sommermeyer's papers he found photographs of one weather station, and a U-boat that did not fit in with the eastern Arctic installations he had previously been able to identify in Greenland and Svalbard. He identified the Labrador coast, but neither Canadian nor American authorities could provide any evidence. Via Jürgen Rohwer and the son of Dr. Sommermeyer, he then identified the U-537 and located the logbook at the archives in Freiburg.

In 1980, he wrote to the official historian of the Canadian Armed Forces, Dr. W.A.B. Douglas. Douglas and the Canadian Coast Guard were able to go and look, and found the remains of the weather station. Some parts were missing, but the canisters, tripod and mast, and some dry-cell batteries were identified. It was dismantled and brought to the CWM.

In July 1944, U-867 reportedly set out from Norway to erect a second weather station in Labrador but was sunk en route by RAF planes.

CWM 18820219-001

Section 7 –Major Equipment in the Permanent Galleries

Gallery 1

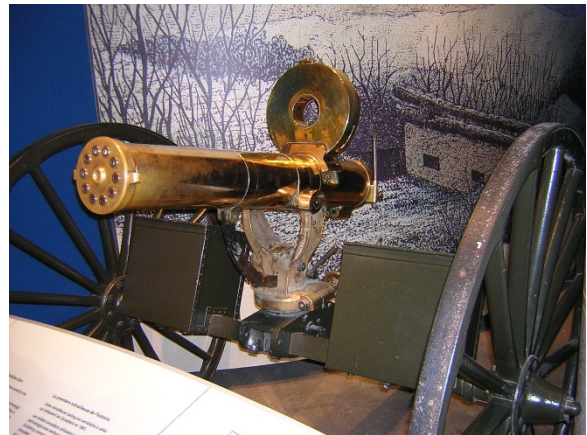
American Model 1883 Gatling Gun

Country of Origin –America

Used 1862 –Present

Used by Canada 1885 –

Richard Gatling invented the Gatling gun in 1861, and the first gun was produced a year later. It had six barrels and could fire at a rate of 200 shots per minute. The gun was used during the American Civil War, and was sold to a number of other countries including Russia, France, and Britain. The gun was produced in a number of calibers from half-inch to 1 inch, but by 1883 the majority were chambered for the standard American army .45/70 cartridge.



A Gatling gun was used against Louis Riel's Métis at the Battle of Batoche in 1885. Captain A. L. Howard, an American army officer who was under contract to the Colt Firearms Company, manned the gun. The gun was a model 1883.

Technical Data (Wahl, Paul and Toppel, Don. *The Gatling Gun*. New York, Arco Publishing Company, 1978.)

Number of barrels:	ten
Calibre:	mm (.45 in)
Weight of gun:	kg (260 lb)
Weight of mounting:	kg (594 lb)
Rate of fire:	up to 1,500 rounds/min (cyclic rate – the practical rate would be much less because of the need to change the 104-round magazines)
Effective ground range:	m (1,000 yd)
Projectile weight:	kg (405 or 500 grain)

CWM 19340001-002 Located in Gallery 1

Gallery 2

British 12-pounder 6-cwt Rifled Breech Loading Gun

Used by Canada 1897 – 1908 (some still in use in 1938)

Technical Data (South African Military History Society)

Detachment:	eight
Calibre:	76.2 mm (3 in)
Weight:	1,676 kg (3,688 lb)
Range:	4,570 m (5,000 yd)
Projectile weight:	5.45 kg (12 lb) - shrapnel
Ammunition type:	shrapnel, case shot



History

The 12-pounder breech-loading gun that equipped the Brigade Division, Royal Canadian Field Artillery, in South Africa began to enter Canadian service in 1897. It replaced the 9-pounder rifled muzzle loading guns that had equipped Canada's field artillery units since the 1870s. The new gun was the standard equipment of the mounted troops of the British horse artillery, and was a great improvement over its predecessor. Loading by the breech was quicker and simpler than ramming ammunition into place from the muzzle, and the 12-pounder had a range of 4500 metres, 1500 metres better than the earlier gun. Smokeless cordite propellant, moreover, eliminated the thick haze that had previously surrounded artillery pieces in action and thereby given away their location to the enemy. (CWM – Imperial Adventure)

The 12-pounder used a forged steel shell with a fuse that could either detonate on contact with an object, or be set to explode at a preset time during the flight of the shell. The gun had a lightweight steel carriage, which was easier for the horses to pull.

Rapid technological developments, however, had already rendered the 12-pounder obsolete by the time of the South African War. Guns of the British and Boer forces fired heavier projectiles to a still greater range. They also featured hydraulic or mechanical systems to absorb the shock of recoil. In the case of the 12-pounder, which lacked these devices, the gun had to be pushed back into position after every round, thus slowing the rate at which it could be fired. (CWM – Imperial Adventure)

Canadian gunners used the 12-pounder in the Boer War. The brigade division of artillery in Canada's second contingent was grouped together three batteries. Each battery consisted of three sections, each of two 12-pounder breech-loading guns. Although usually out of the limelight, the three batteries saw much action. A section from "D" Battery, Royal Canadian Field Artillery, particularly distinguished itself at the battle of Leliefontein. (CWM – Imperial Adventure)

CWM 19730202-001

Gallery 3

American M4A4 *Sherman* Medium Tank (*Sherman* 5) “Forceful”

Used by Canada 1943 – 1945

Technical Data (Forty, George. *M4 Sherman*.)

Crew:	five (commander, gunner, loader, driver, co-driver)
Gross weight:	31,682 kg (69,700 lb)
Maximum speed:	40 km/hour (25 mph)
Maximum trench crossing:	2.44 m (8 ft)
Maximum fording:	1.1 m (42 in)
Engine:	Chrysler A57 370 hp 30-cylinder 4-cycle multibank gasoline
Armour:	up to 75 mm
Armament:	75 mm M3 gun, two 7.6 mm (0.30 in) MG, 12.5 mm (.50 inch) MG



History

The M4 "Sherman" Tank entered production in 1941, and by the end of the Second World War was the main combat tank of the Western Allied Armies. The CWM version is the M4A4, also known in British service as the *Sherman* 5.

There have been a lot of arguments about the Sherman vs the German Tiger (Panzer VI) tank. Generally, from the front, the Tiger could penetrate the Sherman's armour at more than 2,000 metres. The Sherman could not penetrate the Tiger's frontal armour – period. The Sherman had to manoeuvre around to the side of the Tiger, where the armour was thinner, in order to kill it. The rule of thumb was that you would lose about four Shermans before the Tiger was killed. A British/Canadian variant of the Sherman, called the *Firefly*, mounted a 17-pounder anti-tank gun, which could kill the Tiger at more than 1,000 metres. In Northwest Europe, each Canadian troop of four tanks included one Firefly.

The CWM artefact “Forceful” served with the Governor General's Foot Guards in Northwest Europe. It was damaged, but never knocked out in action, and was brought to Canada after the war.

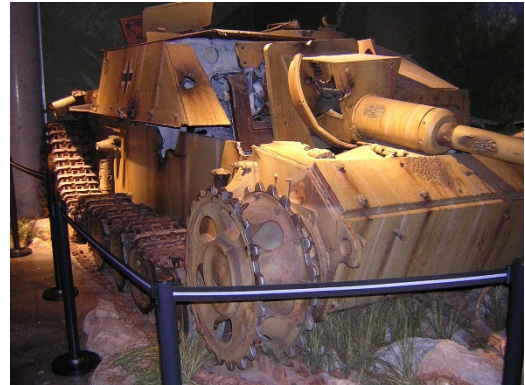
CWM 20040043-001

German Sturmgeschütz (StuG) III Ausf. G. SdKfz 142/2 Assault Gun

Used 1940 – 1945

Technical Data (Foss, *The Illustrated Encyclopedia...*)

Crew:	four, (commander, gunner, loader, driver)
Weight:	22,000 kg (48,501 lbs)
Speed:	40 km/hr (25 mph)
Range:	164 km (102 miles)
Armament:	75-mm gun
Armour:	up to 90 mm
Engine:	Mayback HL 120 TRM V-12 water-cooled 300 hp gasoline



History

The StuG III was designed as an armoured close support vehicle with a low silhouette. To reduce the height, the gun was mounted in the chassis, rather than in a turret. This restricted the traverse of the gun and required close co-operation between driver and gunner. At first the StuG III mounted the short-barrelled 75-mm gun, but this was later upgraded to the long-barrelled 75-mm gun that was mounted in the Panzer IV tank. Some variants mounted a 105-mm howitzer. The StuG III was based on the Panzer III tank chassis. It was popular with its crews and especially with the infantry it supported. More than 10,500 StuG III were built.

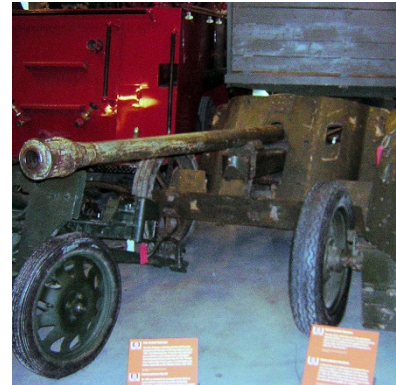
CWM 19880069-939 Located in Gallery 3

German 50-mm Panzerabwehrkanone (Pak) 38 Anti-tank Gun

Used 1940 – 1945

Technical Data (Gander, Terry. German Anti-tank Guns 1939-1945. London, Altmark, 1973.)

Crew:	eight
Calibre:	50 mm (1.97 in)
Weight in action:	975 kg (2,145 lb)
Muzzle velocity:	823 m/sec (2,700 ft/sec) [AP 40 – 1,200 m/sec (3,940 fps)]
Effective range:	450 – 800 m (500 – 880 yds)
Weight of projectile:	2.1 kg (4.56 lb)
Armour penetration:	standard armour-piercing - 78 mm (3.07 in) at 0 degrees incidence at 500 m (547 yd); tungsten-cored projectile - 120 mm (4.72 in) at 0 degrees incidence at 500 m (547 yd)
Ammunition types:	Armour-piercing, high explosive,



History

The 50-mm Panzerabwehrkanone (Pak) 38 was developed in 1938, but not issued until late 1940. It was first used in the Greek and Libyan campaigns of 1941.

The gun was conventional pattern and was fitted with a muzzle brake and a semi-automatic breech (on recoil, the breech opened automatically, ejecting the spent cartridge casing and staying open to receive the new round). Although normally towed by a half-track or small truck, it had a castor wheel that could be attached to the trail to assist in manhandling. It had a 5-mm armour shield with a bottom flap.

Later in the war a hollow charge stick bomb was developed to improve its performance. It weighed 2.33 kg (5.14 lb), could penetrate 180 mm of armour, and had a maximum effective range of 150 m (165 yd).

The gun was also used by the Luftwaffe as a stop-gap anti-aircraft gun (Flak 214) and continued in use with the Bulgarian army after the war.

CWM 19450034-012

German 88-mm Flugabwehrkanone (Flak 37) Anti-aircraft Gun

Used 1937 - 1990

Technical Data (Hogg – German Artillery of World War II)

Calibre: 8.8 cm (3.46 in)
Weight of gun: 4,985 kg (10,992 lb)
Muzzle velocity: 820 m/sec (2,690 ft/sec)
Rate of fire: 15 rounds/min
Maximum AA ceiling: 9,900 m (32,482 ft)
Maximum ground range: 14,815 m (16,202 yd)
Projectile weight: 9.4 kg (20.73 lb)
Ammunition types: High explosive, fragmentation, armour-piercing



History

Originally designed in 1931, the German 8.8 cm Flugabwehrkanone (Flak) was one of the best-known weapons of the Second World War, with more than 10,700 being produced. It was widely used as a heavy anti-aircraft gun for the defence of German cities and industry.

In the Spanish Civil War in the late 1930's, the Germans realised that the Flak 37's high muzzle velocity and heavy projectile made it an outstanding anti-tank gun. Although it was difficult to conceal, it could penetrate the armour of any Second World War allied tank. The gun had such a legendary and notorious status with allied soldiers that any loud noise was liable to be labelled an "eighty-eight".

The CWM gun is the FLAK 37 version, and differs from earlier models by having a three-part barrel and an improved gun-laying mechanism for anti-aircraft use.

CWM 19890086-698 Located in Gallery 3

German 20-mm Flugabwehrkanone (Flak) 38 Anti-aircraft Gun

Used 1940 - 1945

The 20-mm (0.79 in) Flugabwehrkanone 38 anti-aircraft (AA) gun replaced the Flak 30 that had been used in the Spanish Civil War. The earlier gun was redesigned to provide effectively double the rate of fire. Most of the changes were internal and, since the Flak 38 kept the same mounting, there were few visible differences.

By the end of the Second World War, Germany had more than 17,500 2-cm AA guns in use. The Flak 38 was also mounted on a lightweight tubular frame for use by mountain and airborne troops. Late in 1940, a four-barrelled mounting, the Flakvierling 38, entered service. Later versions were fitted with radar.

CWM 19450034-001



Gallery 4

American Huey Helicopter

Country of Origin - United States

Used: 1960 – Present

Used by Canada

The Bell UH-1 Iroquois, better known as the Huey, is probably the most widely used helicopter in the world. More than 5,000 were used in the Vietnam War in general transport, casualty evacuation, command and control, and air assault roles. They were frequently armed and used as gun ships to support ground operations. The "Huey" evolved through at least 13 models. It is the most widely used military helicopter of the current era, and has served in the armed forces of at least 48 countries, including Canada.

Technical Data (UH-1B)

Gross weight:	3854 kg (8500 lb)
Maximum speed:	236 km/hr (147 mi/hr)
Ceiling:	5151 m (16,900 ft)
Range:	418 km (260 mi)
Engine:	Lycoming T53-L-11 820 kw (1100 hp) turbine
Payload:	Two crew, and up to nine passengers or three stretchers. Could be fitted with two M60 machine guns, or a three-barrel 20 mm cannon in the doors

CWM

Located in Gallery 4

American International Harvester M14 Armoured Half-track

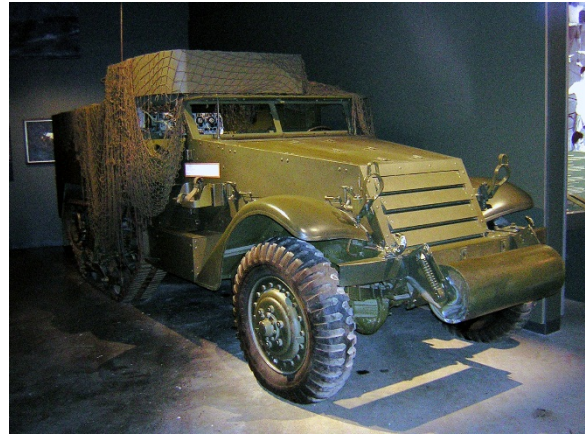
Country of Origin - United States

Used 1941 – 1980s

Used by Canada

The first M3 half-track entered service in the US in 1941, and eventually approximately 41,000 were produced. It was intended to achieve the mobility of a tracked vehicle but unlike tanks, which need complex transmissions and brakes for steering, the half-track used conventional automotive steering.

This simplified the driver training, but the steering and brakes were never as good as conventional vehicles and the First Canadian Army in Britain imposed a 48 km/hr (30 mph) speed limit on the vehicles. There were many variants of the basic vehicle. Canada used the M3-series, M5, M9A1 and M14 halftracks (the CWM artefact).



The M14 half-track was an anti-aircraft vehicle, mounting a Maxson power turret with two 12.7-mm (0.50 inch) machine guns. In Canadian service, the turret was removed and the gap in the floor plated over. Internal seating for eight men could be added, or the vehicle used for general cargo or carrying ammunition. The cargo area could be covered with a locally-manufactured steel roof to create an RCME fitters vehicle or an armoured command post. Another variant was an armoured ambulance. A 4,500 kg (10,000 lb) winch was fitted on the front bumper. About 1,900 M14s were produced, most of which were delivered to the British or Canadians.

Technical Data (Inglee, Bill. *The Halftrack in Canadian Service*. Ottawa, Service Publications, 2003. Also the CMHQ Vehicle Data Book 1944.)

Crew:	three plus eight men in the rear
Weight:	8,714 kg (19,170 lbs)
Maximum speed:	67 km/hr (42 mph)
Engine:	IHC 6-cylinder in-line water-cooled 141 hp gasoline
Armament:	could have 0.50 or 0.30 inch machine gun fitted
Armour:	up to 13 mm

CWM 19710257-001 Located in Gallery 4

British A41 Mk XI *Centurion* Tank

Country of Origin – Britain

Used 1949 – 1990s

Used by Canada 1952 - 1978

The *Centurion* was designed in 1944 and the first prototypes arrived in Germany too late to take part in the Second World War. Development continued and the tank entered British service in 1949. The design was a good one and the tank remained in front line use for twenty years and a few were still in service in the 1990s. Its main shortcomings were its slow speed and short range. It saw combat in Korea, India, South Arabia, Vietnam, The Middle East and Suez. The vehicle formed the basis for a number of variants.



Canada bought 247 *Centurions* Mk V in the early 1950s (at a cost of \$126,344 each) and they served in Germany and Canada until replaced by the *Leopard* in 1978-79. In the 1960's, an additional nine armoured recovery vehicles and four bridge layers were purchased. They were upgraded to the *Centurion* Mark XI about 1960. Improvements included extra hull armour, an infra-red searchlight and an armoured, external, fuel tank.

The tank was generally popular with its crews, until late in its life when maintenance became an increasing problem and reliability dropped off.

The CWM artefact was manufactured in 1952, and served with the Royal Canadian Dragoons.

Technical Data (Marteinson, John and McNorgan, Michael R. *The Royal Canadian Armoured Corps, An Illustrated History*. Toronto, Robin Brass Studio, 2000.)

Crew: four, (commander, driver, gunner, loader)

Weight: 50,894 kg (111,966 lbs)

Maximum Speed: 34.6 km/hr (21.5 mph)

Range: 100 km (62.5 miles)

Engine: Rolls Royce Meteor 12-cylinder 650 hp gasoline

Armament: 20 pounder gun (later replaced by a 105-mm gun), .30 coaxial machine gun and .50 calibre machine gun on pedestal by crew commander's hatch. The machine guns were later replaced by two 7.62-mm machine gun

Ammunition: armour-piercing fin-stabilised discarding sabot (APFSDS), high explosive, smoke, canister, and practice

Armour: up to 152 mm

CWM 19770503-001 Located in Gallery 4

British Daimler *Ferret* Mk I Scout Car

Country of Origin – Britain

Used by Canada 1954 – 1980

The scout car is used for liaison and reconnaissance duties. It normally does not fight, relying on its low silhouette and speed to avoid enemy action. In many Commonwealth countries, it was also used as an internal security vehicle.

British designed and produced Ferret scout cars were used by the Canadian Army in support of NATO in Europe, and on United Nations peacekeeping duties in Cyprus and the Middle East. Canada purchased 124 Ferrets in 1954.



The CWM Ferret is painted in UN colours and its insignia indicates that it was used in the United Nations Emergency Force in the Gaza strip by 56 Canadian Infantry Workshop of the Royal Canadian Electrical and Mechanical Engineers. It may have been used by the 8th Canadian Hussars.

Technical Data (Marteinson, John and McNorgan, Michael R. *The Royal Canadian Armoured Corps, An Illustrated History*. Toronto, Robin Brass Studio, 2000.)

Crew:	two (commander, driver)
Gross weight:	4,225 kg (9,296 lbs)
Maximum speed:	72 km/hour (45 mph)
Range:	314 km (196 mi)
Engine:	Rolls-Royce B60 Mk 6A 96 kw (129 hp) 6-cylinder in-line liquid-cooled gasoline-fuelled
Armour:	12 mm (0.63 in)
Armament:	7.62-mm machine gun

CWM 19800441-001 Located in Gallery 4

British 4-inch Mk XVI Twin High-angle Naval Gun

Also produced in Canada

Used 1945 – 1970 Used by Canada

During the Second World War, the 4-inch Mk XVI naval gun, in a twin Mk XIX high-angle mounting, was the main armament of many British and Canadian destroyers and frigates. They were also the secondary, anti-aircraft guns used on British battleships and cruisers. Canada manufactured over 600 of the 2,555 Mk XVI guns produced during the war. This particular gun mounting was a product of Trenton Industries Ltd., in Trenton, Nova Scotia.

Specifications

Calibre:	101.6 mm (4 in)
Weight of gun:	2,042 kg (4,492 lb)
Weight of mounting:	5,206 kg (11,454 lb)
Rate of fire:	12 rounds/min
Maximum ground range:	18,150 m (19,850 yd)
Maximum AA ceiling:	11,890 m (39,000 ft)
Projectile weight:	18.8 kg (35 lb)
Ammunition types:	High explosive, starshell (illumination)

CWM 19790068-001 Located in Gallery 4



Soviet T-72 Tank

Used 1972 – Present

The T-72 entered production in the Soviet Union in 1971 and was first seen in public in 1977. It quickly became the main battle tank in the Warsaw Pact nations and was exported to many other countries. It has many unique features, such as the automatic loader for the main gun, which reduced the crew by one man. This was not popular with the crew, since the loader had been considered the “general duties person” in the crew and carried out all the menial jobs. It also had a built-in scraper in the lower front hull to create berms and to assist in digging in the tank. Early versions had an optical rangefinder mounted across the turret, which was later replaced by a laser rangefinder. The tank is capable of snorkelling across rivers up to 5 metres (16 feet) deep; the driver has a compass to assist in keeping direction under water. Every tank carries a snorkel and it takes about 20 minutes to prepare the tank to enter the water.



There are at least ten variants of the T-72 and it is in service in 28 countries. The CWM artefact came from Germany after the unification of the country in the 1990s.

Technical Data (Federation of American Scientists)

Crew:	three (commander, gunner, driver)
Weight:	44,500 kg (97,900 lbs)
Speed:	60 km/hr (37.5 mph)
Ground pressure:	0.8 kg/cm ² (11.2 lb/in ²)
Range:	500 km (310 miles)
Engine:	780 hp V-12 water-cooled diesel
Armament:	125-mm smoothbore gun, one 7.62-mm machine gun, one 12.7-mm NSV machine gun in the commander's cupola
Ammunition:	armour-piercing fin-stabilised discarding-sabot, high explosive anti-tank, high explosive
Armour:	up to 520 mm. This figure is deceiving since some of the armour is laminated. Frontally, the T-72 can withstand a hit from the NATO-standard 105-mm gun at ranges up to 2,000 metres.

CWM 19920153-001

Section 8 –Major Equipment not in the Galleries

American Dodge WC-54 Ambulance

Country of Origin - United States

Used 1942 - 1945

The Dodge 4x4 ¾-ton truck was produced in large numbers as a utility vehicle during the Second World War, in many different models. It was developed from, and more than 80% of its parts were interchangeable with, its ½-ton predecessor. It was almost as universally loved and used as the Jeep, and more than 250,000 were built. This version, the WC-54, was fitted as an ambulance, with space for four stretchers or seven sitting patients. More than 25,000 were manufactured between 1942 and 1944, and it was widely used by the U.S. Army Medical Corps.

Technical Data

Maximum weight: 3,204 kg (7,050 lb)

Maximum speed: 86 km/hour (54 mph)

Cruising range: 384 km (240 mi)

Engine: 6-cylinder, 67 kw (92 hp) Dodge T-214 gasoline-fuelled

Payload: Two crew plus four stretchers or seven sitting patients

CWM 19970113-012

American Dodge WC-56 Command Car

Country of Origin - United States

Used 1942 - 1945

The Dodge 4x4 ¾-ton truck was produced in large numbers as a utility vehicle during the Second World War, in many different models. It was developed from, and more than 80% of its parts were interchangeable with, its ½-ton predecessor. It was almost as universally loved and used as the Jeep, and more than 250,000 were built. This version, the WC-56 Command Car, was intended as a front-line transport for officers. It was fitted with bench-type leather rear seats, which were accessible through a cutaway door opening. It was widely used by the American army, but its distinctive shape tended to attract the unwelcome attention of snipers and enemy aircraft, and many officers preferred to use the more anonymous jeep. More than 27,000 were built, and many consider that it was the most comfortable wartime 'truck' to ride in.

Technical Data

Maximum weight: 3,204 kg (7,050 lb)

Maximum speed: 86 km/hour (54 mph)

Engine: 6-cylinder, 67 kw (92 hp) Dodge T-214 gasoline-fuelled

Payload: Driver plus three to five passengers

CWM 19970113-008

British Corgi Parascooter

Country of origin – Britain

Used 1946 - 1955

During the Second World War, parascooters were developed to provide airborne forces with motorised transport that could be packed in small containers and dropped by parachute. The Corgi parascooter was a post-war development of the British "Welbike" that was used in Northwest Europe and the Far East. Produced by the Brockhouse Engineering Company in Britain, it was larger than the Welbike, but was still a single-speed bike with no gearbox.

Technical Data

Maximum weight:	43 kg (95 lb)
Maximum speed:	48 km/hour (30 mph)
Range:	240 km (150 mi)
Fuel capacity:	4.7 litre (1.25 gallon)
Engine:	98 cc 1-cylinder, 2-stroke Excelsior Spryte gasoline-fuelled
Package size:	1.35 m x 0.5 m x 0.3 m (4 ft, 5 in x 20 in x 13 in)

CWM 19680101-001

French SS-11B Anti-tank Guided Missile

Designed in France

Used by Canada 1962 – 1980

First fired in 1960, the SS-11 was a wire-guided anti-tank missile that was designed to be launched from a vehicle, a helicopter, or the ground. France eventually delivered more than 330,000 SS-11 missiles to more than 20 countries. The anti-tank warhead was capable of penetrating 60 cm (24 in) of armour plate, which could destroy any tank of the period. An operator, looking through a telescope, used a joystick to control the missile until it reached the target up to 22 seconds after being fired. Accuracy depended heavily on the skill of the gunner, who required continuous training to maintain his proficiency.



Technical Data

Diameter:	15.2 cm (6 in)
Launch weight:	29.9 kg (66 lb)
Maximum ground range:	3,000 m (3,281 yd)
Minimum ground range:	500 m (547 yd)
Propulsion:	Two-stage, solid propellant rocket motor
Warhead types:	Anti-tank, anti-personnel, high-fragmentation anti-personnel

CWM 19940001-465